AN ECONOMIC ANALYSIS OF THE PERPETUAL EMIGRATING FUND

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"Passage money" sent from America to relatives and friends still at home replaced indentured servitude as the main source of external financing for emigration to America in the early nineteenth century. Members of The Church of Jesus Christ of Latter-day Saints (Mormon) formalized prepaid passage under the Perpetual Emigrating Fund (PEF). The PEF provided loans to Mormon emigrants in the form of prepaid passage to Utah. Roughly thirty percent of all Mormon emigrants from the British Isles received PEF loans prior to its dissolution in 1887. At the time, universal emigration was official Mormon policy, so convert baptism also indicated intention to emigrate.

This research creates a sample of 2,250 Mormon household heads who emigrated from the British Isles to Utah, 1854-1885. Information is gathered from the Mormon Immigration Index, financial records of the PEF, and the Minnie Margetts index to early Church membership records. In compiling the household head sample, multiple data collection techniques are employed: manual transcription, optical character recognition software, and probabilistic record linking. Loan receipt and the time lag between baptism and emigration are used to analyze the interplay of prepaid passage and the timing of emigration using a simultaneous equations model. Analysis of loan size is further estimated using an IV Tobit model. As expected, household heads with skilled occupations tended to emigrate more quickly than those with unskilled occupations, though the relationship was not linear. PEF loan receipt hastened emigration for unskilled borrowers and

women, but it lengthened delays for skilled and semi-skilled borrowers. Loan allocation was based primarily on how long the family had been waiting to emigrate. The number of workers in the household age 15 and older also had a positive impact on loan receipt.

Time series estimation is used to investigate the relationship between economic conditions and annual Mormon emigration from the British Mission, which varied from 86 to 2,431 persons per year in 1855-1895. Time series data are transcribed from original manuscript administrative records of the British Mission. Higher income in Utah is associated with higher emigration rates, while higher income in England is associated with lower emigration rates. Surprisingly, there is no discernable effect for the British employment rate. Increases in the size of the PEF annual fund also tended to increase emigration rates. Analysis confirms that Mormon emigrants responded to economic conditions, despite the presumably religious motivations for emigrating.

Taken together, the household-level and time-series analyses paint a comprehensive picture of the impact of the PEF on Mormon emigration. Financial assistance hastened emigration at the household level and increased overall emigration at the community level. These results expand the literature on nineteenth century prepaid passage. To the extent that family lending continues today, these results may have important implications for consideration of family ties in modern immigration policy.

BIOGRAPHICAL SKETCH

Heather Fay (Wynder) Howard received her B.A. in Economics, with University Honors and Cum Laude, from Brigham Young University in 1998, where her honor's thesis, "How Much Does Air Pollution Really Cost?" was directed by Dr. C. Arden Pope. She received her M.A. in Economics from Cornell University in 2005.

Dedicated to the men and women who donated to and benefited from the original Perpetual Emigrating Fund or its successor, the Perpetual Education Fund.

ACKNOWLEDGEMENTS

While responsibility for the substance and form of this research is my own, I could not have completed my dissertation without significant help. First, and foremost, committee member Dr. JS Butler "immediately recognized" my "obvious enthusiasm for the topic." He encouraged me to expand my original vision: rather than pursue this as a side paper, JS suggested I adopt it as the main thrust of my dissertation. He introduced me to the field of Economic History, though not an Economic Historian himself, and put me in contact with researchers who were better-qualified to answer my questions. Beyond helping me choose my dissertation topic, JS has been a teacher, mentor and friend.

Access to archived documents was provided courtesy of the Church History Department, The Church of Jesus Christ of Latter-day Saints. Among the many archivists and historians to help me, special thanks are due to Ron Watt. Ron fueled my interest with his own enthusiasm for the PEF and his extensive understanding of the surviving records. He never tired of my inquiries and helped me gain access to the original records when I needed it.

As my project matured, Dr. George R. Boyer pushed me to better articulate how my research fit in context. A true Economic Historian, he introduced me to the broader body of literature and regularly sent me articles he thought I should read. The pursuit led me to find improved time series data and to develop a research agenda that will keep me busy for at least a few more years. In the end, George became my committee chairman and eagle-eyed proof reader. Without his sense of humor and attention to detail, this project would have been a shadow of what it is.

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Finally, this work would not have been possible without the personal sacrifice of my husband, Micah E. Howard. He moved to Utah with me so I could have regular access to the records and experts I needed. The move was not easy for him personally or professionally, and I am grateful for his support and encouragement.

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CHAPTER 1

INTRODUCTION

"Few thought of emigrating who did not look first for help to their friends or relatives in America, and rarely were they disappointed." (Schrier, 1958)

Discussion of nineteenth century immigration is often personified with the image of an unskilled, single young man or a young, unskilled married couple seeking fortune in a new land of opportunity. Indeed, the latter half of the century was marked by substantial proportions of young workers who provided a seemingly limitless supply of labor to the growing US economy. The immigration of older individuals and families, however, was also important in shaping the landscape and western boundaries of the ever-expanding United States. Present-day Utah, Idaho, Nevada, Arizona, and western Canada each have numerous communities settled in large part by families immigrating with The Church of Jesus Christ of Latter-day Saints (commonly abbreviated as LDS or Mormon).

The role of family and friends was critical to financing the cost of relocating to a new country through the provision of information, remittances, and prepaid passage. Prepaid passage evolved from redemptive servitude, a derivative of indenture. Family already living in the United States replaced merchant brokers in the payment of passage across the ocean. Upon arrival, the new emigrants were not bound to a labor contract. Instead, they were bound only to whatever informal arrangements had been established with their kin.

Chain migration through prepaid passage pervaded nineteenth century emigration. Jerome (1926) asserted that thirty-two percent of all immigrants to the United States at the turn of the twentieth century had passage paid by relatives.

Schrier (1958) estimated that prepaid passage accounted for seventy-five percent of all Irish emigration in the fifty years following the famine. Hvidt (1975) observed as many as one half, and at least one fifth, of all Scandinavian emigrants travelled on passage prepaid in America, varying by year and country of origin.

Existing literature estimates the prevalence of prepaid passage using sources such as money transfers from America, the sale of passage, and personal letters and interviews. These sources allow analysis of prepaid passage in the aggregate, but they are less useful for examining the effect on the individual or household, other than as a particular case study. However, an interesting record exists of emigrants with religious ties: the Perpetual Emigrating Fund Company (PEF).

The PEF essentially institutionalized prepaid passage among Mormon emigrants where religious affiliation replaced the traditional family ties. Loans, in the form of prepaid passage to Utah, were distributed by PEF agents. Borrowers were expected to repay loans as they were able, much as might have been expected among family lenders. The PEF differed from informal lending, however, in the maintenance of detailed records which survive today. The fund was perpetual in the sense that new loans were issued as existing loans were repaid. About thirty percent of Mormon emigrants received PEF loans between 1854 and dissolution of the fund in 1887.

The macroeconomic factors influencing this mass migration and the ability of the new workers to assimilate has been studied in great detail by several authors.[1] The microeconomic factors affecting the financing and timing of emigration have received somewhat less attention. The main reason for the lack of attention is likely the dearth of relevant data. Mormon records provide a rich source for individual-

[1]For a detailed review of existing literature, see Hatton and Williamson (1998).

and household-level microeconomic research, particularly as it applies to the distribution of prepaid passage.

This research links records from three different sources to create a cross-section of Mormon emigrants from the British Isles, between 1854 and 1885. Data are collected using a combination of manual and electronic transcription methods, and I establish links between records using probabilistic data-matching techniques. The final data set includes household-level records of emigration, PEF loan receipt, and convert baptism. Detailed demographic and economic variables are recorded for the household, including occupation of the household head. Baptismal records are important because convert baptism indicated not only adoption of a new faith but also the intention to emigrate to Utah. The data provide a baseline for comparing Mormon emigrants to their contemporaries, as well as for other analysis.

With the new data, I examine the emigrant timing decision at the household-level. I rely on the secondary meaning for baptism as a public declaration of a convert's intention to emigrate. The delay between baptism and emigration is modeled as a function of household characteristics and the availability of prepaid PEF passage. These results confirm economic predictions that households with greater financial resources are able to emigrate more quickly than those without. The estimation also sheds light on what factors were taken into consideration as PEF loans were distributed.

A second line of inquiry focuses specifically on the determination of PEF loan size. The purpose is to identify which factors were the most important to PEF agents as they rationed funds among potential borrowers. This not only expands understanding of the PEF in particular, but it also suggests where emphasis might be placed for future research on prepaid passage from other sources.

I complement the household-level analysis with time series estimation of annual Mormon emigration rates. Their motives for immigrating were similar to those of many other emigrants: financial opportunity, political liberty, and religious freedom. Existing data are compiled from established economic sources, Utah census records, and statistical reports of the Church in the British Isles. Where there are gaps in the existing data, I use numerical estimation methods to approximate missing values. Time series estimation confirms that Mormon emigration responded to economic influences in Utah and the UK. The results are consistent with existing research using national emigration rates. An important implication is that findings based on Mormon emigration data can be generalized to apply broadly to other emigrants, despite the unique religious identity of the group.

CHAPTER 2

EXISTING LITERATURE

2.1 Introduction

Economic analysis of the PEF requires an understanding of the historical context in which the PEF existed. The chapter begins with an introduction to Mormon history and the organization and functioning of the PEF. The chapter continues with an in depth discussion of economic research related to methods of financing emigration and the timing of emigration. Finally, Mormon emigrants are compared to other groups of emigrants.

2.2 A Brief History of Mormon Emigration

Mormon immigrants first entered the Salt Lake Valley on July 24, 1847, seventeen years after the Church was organized in upstate New York. Through the end of the century, annual immigration levels varied from fewer than two hundred to nearly four thousand. Mormon immigrants pioneered a trail that would later coincide with the paths of other pioneers to Oregon and the California gold rush. The Mormon Trail officially ended in the Salt Lake Valley, but settlements soon fanned out in all directions. Communities were founded throughout present-day Utah; southern Alberta, Canada; northern Mexico; Idaho; Nevada, including Las Vegas; Arizona, including Mesa; and a temporary settlement in southern California.

Prior to arrival in Utah in 1847, three settlement communities were attempted and eventually abandoned in Kirtland, Ohio; Far West, Missouri; and Nauvoo,

Illinois. In each location, mob violence forced out the Mormon settlers. Hate crimes against Mormon settlers were likely motivated by religious, political and social differences between the locals and the new arrivals. Salt Lake City was finally chosen as a destination in part because of its geographic isolation and the absence of other settlers. Arrington (1958) provides an expanded discussion on the selection of Utah as a gathering place.

Latter-day Saint emigrants came primarily from Europe and other parts of North America, with about one third traveling directly from the United Kingdom. Emigration from Europe was a direct result of a world-wide missionary effort. The specific details of how missionary work was conducted is beyond the scope of this research, however Evans (1984) contains a detailed discussion of missionary work in the British Isles. Mormon pioneers tended to be older and better skilled than their contemporary immigrants to North America. They were also more likely to be married and more likely to travel with children (Carson, 1998).

2.2.1 The Practice of "Gathering"

Mormon missionaries traveled throughout the world preaching doctrine and baptizing converts. Initially, the majority of converts were found in the British Isles. In addition to adherence to their new faith, converts were encouraged to make every effort to emigrate with their families and to offer financial assistance to fellow emigrants with less means where possible. This was referred to as "gathering to Zion." The commitment to "gather" with coreligionists was explicit in missionary tracts as well as sermons and publications directed to the general membership. The Church periodical, *Millennial Star*, regularly published, "News from Home," with letters from leaders and ordinary emigrants about the journey west and conditions

in Utah. The feature title suggested to readers that their current residence was to be viewed as temporary as they prepared to emigrate to a new home in Salt Lake (Taylor, 1965, 26).

Economic as well as religious reasons were offered as motivation for emigration. The president of the Church, Brigham Young, encouraged emigration to the Salt Lake Valley as a way to escape economic hardship in England (Larson, 1947). Two specific incentives were low unemployment and the availability of fertile land at minimal cost (Taylor, 1965, 26). Low unemployment was a product of rapid expansion of the settlement region. Not only was labor needed to clear land and build homes, but also Church sponsored community-development projects hired new converts upon arrival (Carson, 1998). Overall, Church publications lauded the Great Basin as a land of financial opportunity and personal liberty (Hafen and Hafen, 1960).

Young urged Church members in the United States and abroad to relocate as quickly as practicable. It appears that all members who maintained active participation in the Church eventually emigrated to Utah. Universal emigration continued to be official Church policy through the end of the nineteenth century, with one notable exception. In 1857, Colonel Albert Sidney Johnston led troops in the United States army to the Utah Territory. Though the matter was eventually resolved diplomatically, it had a dramatic temporary impact on emigration. An October 1857 announcement made in Europe instructed members to "stop all emigration to the states and Utah for the present." Brigham Young announced the official reinstatement of emigration policy in Salt Lake City, in October 1858.

Emigration tended to increase during international crises. For example, during the Crimean War Mormon emigration accounted for 2.4% of all emigration

from Europe to the United States. Surprisingly, emigration continued to be high throughout the American Civil War, when overall immigration to the U.S. was particularly small (Jensen and Hartley, 1992).

To facilitate universal emigration, Church leaders developed a variety of strategies for cutting the cost of transportation. Jensen provides an interesting discussion of the relative successfulness of several Church financing schemes, including Church trains, handcarts, and the PEF. A common theme among the Mormon aid plans was to leverage individual effort with community-based altruism.

The practice of gathering waned in the late 1800s due to a number of factors including anti-Mormon political pressure in Utah and a slow-down in conversion rates abroad. After the turn of the century, the policy of universal emigration was officially discontinued. Modes of international communication improved, facilitating the establishment of permanent congregations outside of Utah, and converts were encouraged to build up congregations in their own towns. Prior to 1890, however, adult baptism indicated not only conversion to a new faith but also intention to emigrate to the Salt Lake Valley.

2.2.2 The Settlement of Utah

The population of Utah grew exponentially in the first few decades after settlement. As shown in table 2.1, 11,000 immigrants had arrived from the United States and abroad by 1850. An additional 29,000 arrived the following decade, and by 1900, 276,719 people lived in Utah. The population growth was due primarily to immigration. In 1880, the crude birth rate for Utah was slightly higher than the rest of the country, but in 1890 and 1900 the birth rate in Utah was slightly

Table 2.1: Population of Utah, 1850-1890.

		% of Population under 10 years		**% of Population Male**	
Year	Utah Population	Utah	U.S.	Utah	U.S.
1850	11,380	45.4	29.1	53.1	50.4
1860	40,273	50.0	28.7	50.3	51.2
1870	86,786	48.3	26.8	50.8	50.6
1880	143,963	45.1	27.1	51.8	50.9
1890	210,779	40.3	24.3	53.1	51.2
1900	276,749	40.8	23.7	51.2	51.1

Source: Data from the United States Bureau of the Census as compiled in Poll (1978: 688).

lower.[1] Throughout the century, Utah had relatively more young children than United States in general, but the overall gender ratio was approximately equal.

Population growth was concentrated in Salt Lake County. Using estimates by Kearl and Pope (1984), about three quarters of the population lived within the four most populous counties in 1860 and 1870. For the same two decades, 48% and 36% of the population, respectively, had farm-related occupations. For 1870, Kearl and Pope (1984) broke down the distribution of occupations into several classes. After farming, the most common occupational classes were laborer (19%) and craftsman (13%). The distribution of birthplace was decidedly foreign. Forty-six percent were born in an English-speaking foreign country. Nineteen percent were born in

[1]For the years 1880, 1890, and 1900, respectively, Utah had 41.9, 26.9, and 27.2 births per thousand while the birth rate in the U.S. was 39.8, 32.9, and 32.3. Reliable measures of the birth rate for Utah are not available for earlier years (Miller, 1978, 688).

a non-English-speaking country. Five percent were born in the southern U.S., and the remainder were born in northern states.

The two halves of the transcontinential railroad were joined at Promontory Point, Utah, in 1869. The railroad had an effect on the community in two general ways. First, construction of the railroad tracks provided employment, and workmen on the railroad earned up to $6 a day (Taylor, 1965, 105 and 134). The wages provided a much-needed infusion of cash into the economy. The infusion of cash was important, because the combination of geographic isolation with the arrival of cash-strapped immigrants made it difficult to turn resources into cash. Cash was needed to purchase passage for future immigrants as well as to purchase other needed supplies. Second, the railroad sped overland transportation. The impact on trade was to lower the cost of imports from the East. The impact on immigration was to make the journey safer and shorter, especially when combined with steam ship travel across the ocean. On the other hand, Arrington (1958) argued that the expansion of rail transportation hindered Mormon immigration, because it was difficult to raise the cash needed to purchase passage.

Israelsen (1982) estimated annual income per worker and per capita for Utah, for eleven years between 1855 and 1895, using tithing records. Church members were asked to donate a tenth of their income to support Church expenses. Tithing records indicated how much an individual donated in nominal terms and as a percentage of a full tithe. Total income for an individual was estimated using the total amount paid and the percentage of the tithe it represented. Tithing was commonly paid with livestock, grain, or produce, as well as cash. Church leaders created a price index to determine the value of "in kind" donations. Israelsen linked the tithing price index with a U.S. wholesale price index to create income estimates

in real terms. The Gini ratio was then calculated for each year in the sample. Israelsen regressed the Gini ratio on several measures of economic development– average income, population growth, fraction of population born in non-English-speaking countries, and the grasshopper destruction.

Israelsen found that income inequality tended to increase with average income level. Population growth tended to decrease inequality, but the fraction of the population born in non-English-speaking countries had the opposite effect. In 1855, a swarm of grasshoppers destroyed large sections of the agricultural crops. The infestation was the worst in Utah's history, and not surprisingly, the exogenous shock was associated with increased income inequality. Based on these results, Israelsen concluded that Utah was still in the "early" stages of economic development when it became a state, in 1896.

Kearl, Pope, and Wimmer (1980) examined the distribution of wealth within Utah, controlling for income, by creating an unbalanced panel of Utah households linked between the 1850, 1860, and 1880 Federal Manuscript Census. During those years, the census included measures of personal wealth. The panel was linked to records of tithing paid by Church members to infer an annual income. Using the unique measures of wealth and income, Kearl et al. measured the distribution of wealth in Utah at different points in time.

In 1860, the distribution was more egalitarian than in the East, but the distribution became less egalitarian in later census years. The change in the wealth distribution was likely a result of two factors. One, by 1880 early arrivers had been gathering wealth for as many as three decades longer than later arrivers, whereas in 1850 there was little variation in the length of time since arrival. Two, early

arrivers were able to choose the most fertile land and establish businesses early on, while later arrivers were left with less productive land and more competition.

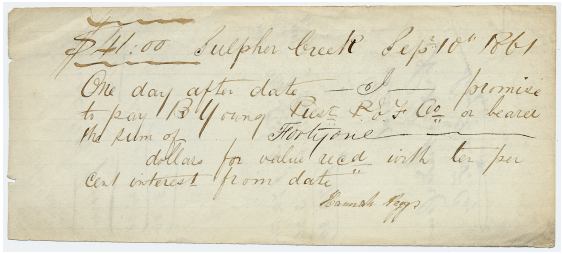
2.2.3 The Perpetual Emigrating Fund Company

The PEF channeled financial assistance between Mormon pioneers for the purpose of emigrating to present-day Utah. Applicants could qualify for PEF passage a number of ways: be skilled in a craft or trade needed in Salt Lake; be "sent for" by a friend or family member donating to the fund; or be a member of the Church for ten years or more and show financial need. Originally designed as a revolving fund, the PEF began in 1849, with about $5,000 in gold donated by Church members already established in the Salt Lake Valley, which is equivalent to $136,000 in 2006 dollars (Arrington, Fox and May, 1976; Officer and Williamson, 2006). The PEF was officially incorporated in Salt Lake City in 1850, and records of loans are available from 1852 onward (Hafen and Hafen, 1960).

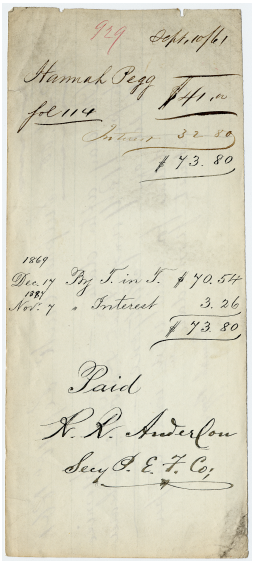
A PEF loan was offered in the form of prepaid passage. Any portion of the cost of passage that could be paid by the emigrant was accepted as a deposit, and a promissory note was issued for the balance. Passage recipients were expected to repay loans after getting settled in their new homes in Salt Lake, so new loans could be made to other hopeful emigrants. Passage was offered for the current year only, with no guarantee for deferment to the following season. Cash was not dispensed, so borrowers could not be persuaded to use the funds for any other purposes, no matter how well-intentioned. The financial windfall of PEF passage would have had a dramatic and immediate impact on the household receiving a loan, resulting in immediate emigration.

While most promissory notes were preprinted, frontier life occasionally required creativity in record-keeping as can be seen in figure 2.1. Remittances were recorded on the reverse side of the household's promissory note, and the note was returned to the borrower upon repayment in full. Loans and remittances were also recorded in the PEF General Ledger in Salt Lake City. PEF promissory notes featured a 10% rate of interest, however interest charges were not consistently recorded in the general ledger. The amount of interest charged and the date on which charges were posted did not follow an obvious schedule, and often interest charges were posted and forgiven on the same date. For a detailed analysis of the PEF record-keeping system, see appendix C.

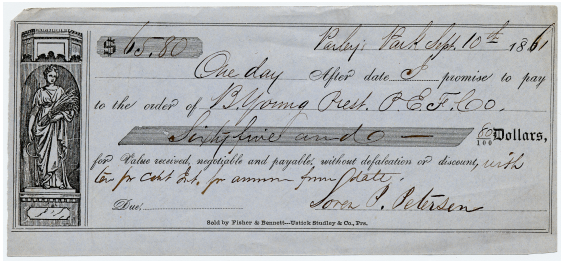
The PEF also played a key role in organizing emigration. Church leaders, called emigration agents, chartered trans-Atlantic voyages through the PEF and booked passage for as many members as possible. Church emigration agents advised members how to prepare for emigration–such as what to pack–and helped members avoid the perils at the docks. The agents divided emigrants into groups, called companies, and appointed company leaders. Company leaders organized religious services, as well as rotations for cooking on board the ships. Other emigration agents met companies upon arrival in the United States and arranged subsequent legs of the journey West. Modes of transportation and methods of providing aid varied through the life of the fund, in attempts to minimize cost. Notable innovations included the use of oxen rather than horses to pull wagons, the use of handcarts–modified wagons that were pulled by hand–and the use of "down and back" supply trains–reconnaissance wagon trains assembled in Salt Lake that drove east to meet the incoming immigrants and accompany them back to Salt Lake (down and back) in a single season.



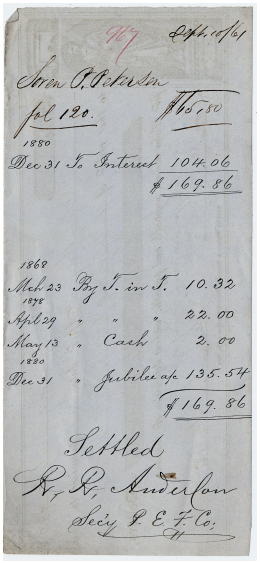
(a) Hannah Pegg (front)



(b) Hannah Pegg (back)



(c) Soren Peterson (front)



(d) Soren Peterson (back)

Figure 2.1: Two Sample Promissory Notes. Hannah Pegg promissory note front (a) and back (b). Soren Peterson promissory note front (c) and back (d).

In an attempt to collect outstanding debts, PEF officials compiled and published a list of borrowers in default in 1877 (Company, 1877). The one-hundred

ninety-four page list included individuals owing a combined total of more than one million dollars, plus interest. The indebtedness list was distributed to ecclesiastical leaders throughout the Mormon settlement region with a letter of instruction signed by the president of the Church and the president of the PEF. Church leaders were asked to identify all debtors living in their geographic region and send a full list to the PEF office. The list was to include the borrowers' full names, current ages, the years they arrived in Utah, and the "Captain of the companies" they traveled in. Leaders were instructed to collect cash where possible, but livestock and crops could also be collected as repayment.

The purpose of the list was not only to collect outstanding debts, but also to identify individuals unlikely to repay their loans. "The poor, the widow, the aged, or the infirm . . . [and] debtors that have died or apostatized" were to be particularly noted. Church leaders were authorized to forgive the interest on loans as an incentive for "prompt repayment of the principal" (Company, 1877, 2 of the cover letter). Where the borrower could not repay the loan, extended family members were to be approached. Leaders were asked to document any extenuating circumstances of borrowers in their correspondence with the PEF office. Debt forgiveness was entered into the the general ledger under the heading of "Jubilee," a reference to the year long celebration of the thirtieth anniversary of the settlement of Salt Lake *Watt, personal correspondence.*

PEF lending, along with overall Mormon emigration, slowed considerably in the 1880s. Probable causes of the down-turn included government pressure in America and a decline in the conversion rate abroad. In 1887, anti-Mormon forces in Congress passed the Edmunds-Tucker Act which dissolved both the PEF and the sponsoring Church as legal entities and authorized government confiscation of

all PEF property, including the record books, and most Church property. Church officials filed a series of lawsuits in opposition to the act. The Utah Territorial Supreme Court appointed a "receiver" to take possession of the disputed property (both Church and PEF property) while the issue was caught up in litigation. In 1893, a joint resolution of Congress reversed the 1887 Edmunds-Tucker Act. All property and records were returned to the Church in 1896, but the PEF was never reincorporated.

2.3 Methods of Financing Emigration

In 1850, the cost of steerage passage from Liverpool to New York was roughly equivalent to one month's wages for a skilled emigrant or two months' wages for an unskilled emigrant (Baines, 1991, 44-5). Upon arrival, additional funds were needed to secure room and board until employment could be secured. Erickson (1976, 137) estimates that those traveling on sailing vessels would have forgone one to three months of income in order to travel. The total expense was particularly significant in light of the observation that few working-class individuals had any formal savings accounts at that time (Boyer, 2007).[2] Many emigrants succeeded in self-financing the move to the United States, but it is not surprising that a sizable number sought external assistance in meeting the financial challenge.

According to Wokeck (2002) the evolution in methods of financing emigration to the United States can be classified into three phases. The first phase consisted of a few prosperous colonists who succeeded in moving to and capitalizing on opportunities in the New World. The second phase was dominated by poorer

[2]For those that had accounts, the median balance was perhaps £4 (Boyer, 2007).

immigrants who relied heavily on indentured servitude and, later, the redemptioner system, to finance the cost of passage. The redemptioner system was particularly beneficial to families and single young men. The third phase was characterized by informal credit markets and lower cost of passage. Informal loans were offered to Europeans wishing to emigrate in the form of prepaid passage purchased by relatives or friends already established in America.[3] The cost of passage decreased as the growing number of import companies returning to America converted their otherwise unused cargo space into steerage accommodations for passengers. The PEF provided prepaid passage through a system closely related to informal family lending.

2.3.1 Indentured Servitude

The Virginia Company began importing servants to North America in 1619 to meet the needs of both would-be emigrants who could not afford the cost of passage and colonial planters who could not find sufficient numbers of employees (Galenson, 1984). The Company advanced the cost of transportation for an emigrant, and the emigrant entered into a contract to repay the debt out of net earnings upon arrival in America. In the first year, the new settlers were employed by the Company and rented out to small planters. According to Galenson, renting out servants in that first year led to inadequate investments in the care for workers by the lessors, as evidenced by high mortality rates and many runaways.

Outright sale of the labor contract was quickly established as the preferred market outcome. A small planter could purchase the labor of the immigrant for a set period of time by paying a lump sum to the importing company. Supervision

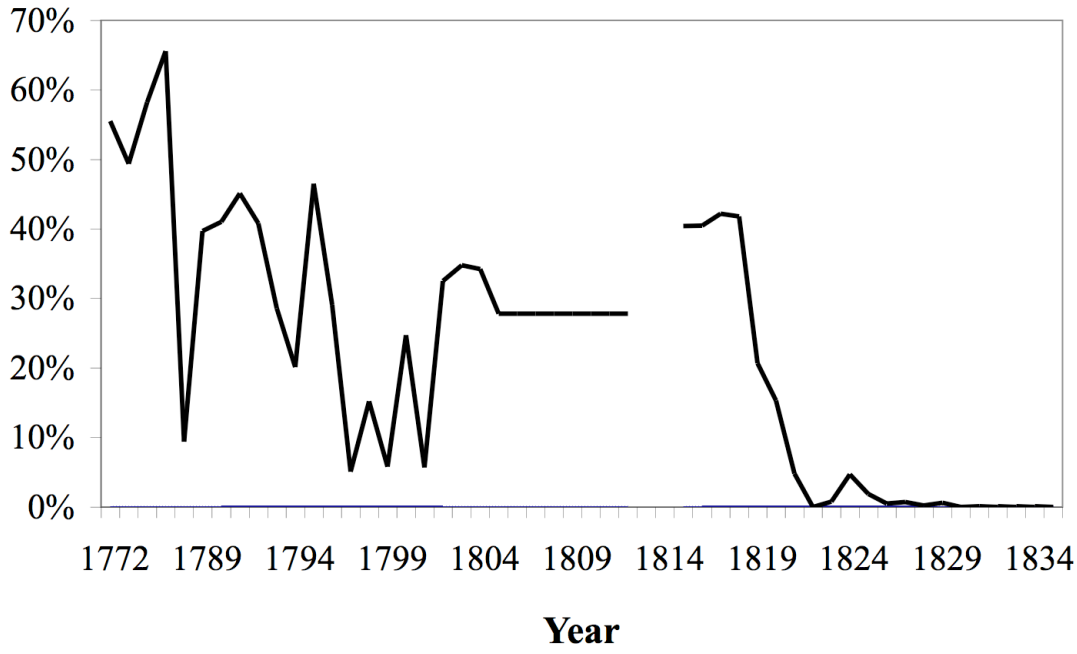
[3]Prepaid passage was one form of remittances sent back home from immigrants in America.

and enforcement costs were lower for a small planter caring for a few servants than for the larger company managing many servants. By purchasing the contract outright, the small planter internalized the health and runaway risks of servants, ensuring more efficient investments in care.

By 1620 the indentured servant market was firmly in place. Many European merchants began trading labor contracts, since the only startup cost was the cost of passage between signing the contract in England and selling the contract in the colonies. For the seventeenth century, between one half and three quarters of all white immigrants were indentured servants. The initial participants were from England, but later many Scottish, Irish and German immigrants arrived as indentured servants (Galenson, 1984).

A labor contract typically lasted four or five years, but the type of labor for which an immigrant could be contracted was varied. The length of the indenture contract varied with the expected productivity of the worker, so contracts tended to be shorter for older, skilled, or literate workers. Contracts for children were substantially longer–often extended until the child reached the age of maturity. The added length included arrangements for schooling or other formal training for the children. "Freedom dues" were a common component of a labor contract. "Freedom dues" consisted of a lump sum payment given to the servant when the contract was fulfilled to help the immigrant transition through unemployment and to find new housing. Larger freedom dues could be negotiated for a longer contract period (Galenson, 1984; Grubb, 2006).

Galenson found that contract owners could use a variety of enforcement mechanisms with their contracted servants. By way of punishment, servants could be beaten–but not killed–by their employers. If the beatings were extreme, then ser-



Source: Grubb (1994: appendix table 1).

Figure 2.2: Percentage of Servants Among German Immigrants to Pennsylvania, 1772-1835.

vants might run away, a threat which acted as a natural deterrent to contract owners. By way of incentives, servants could be rewarded for industry. Rewards included early release from the contract, higher freedom dues, and private land or livestock for the servant's personal use. The frequency with which punishments and rewards were used cannot be quantified.

The cost of indenture to the emigrant included substantial loss of personal freedom and autonomy. Analysis by Galenson indicates that emigrants tended to choose indenture more often when the cost of passage was high relative to wages in England. The inverse relationship between indenture and relative cost suggests that indenture was only chosen if self- financing passage was not feasible.

2.3.2 Redemptive Servitude

Redemptive servitude developed as a variant of indentured servitude. Emigrants signed a contract to pay passage upon debarking in America, rather than a contract to work upon debarking. Upon arrival in America, the emigrants, called redemptioners, had approximately one month to repay the debt. Ideally, a family member or friend would come to the dock and redeem the debt. Alternatively, redemptioners could pay their debts by auctioning their belongings. As a final resort, redemptioners could repay their debt by entering into labor contracts. Shippers typically charged a 15% markup on the cost of passage for a redemptioner. The markup helped compensate the shipper for potential loss of revenue due to death of emigrants in transit (Grubb, 1994).

The ability of redemptioners to enter into a labor contract at the docks allowed immigrants traveling as families to shift debt between family members, including children. Grubb (2006) found evidence of limited intra-family debt shifting among German immigrants to Pennsylvania in 1773. The most common debt-shifting occurred when immigrant children between the ages of 9 and 13, inclusive, were indentured for a period longer than required to pay the cost of passage for the child alone. Children in this age group were only charged half the price of an adult passage, yet they had a high net labor value. By indenturing the children in this age range to the age of their maturity, an average mark-up of 155%, the passage debt of the parents or other children could be paid. Children older than 14 were also indentured to maturity, but they were charged the full adult passage and their contracts were shorter, by definition. Children younger than 9 were not typically indentured.

Shifting debt from parents to children was not as abusive as it might seem to the modern reader. Alternatives available to the families may have been much worse. For instance, if the parents indentured themselves but not their children, then the children would have been necessarily left unsupervised. Room and board for infants or young children could have been included in a parent's indenture contract, but older children would have been excluded. Also, pauper children were subject to involuntary indenture under the Pennsylvania poor law, so unsupervised children would have been indentured without contributing to the family debt. Finally, in the absence of debt-shifting, the parents may have been unable to immigrate at all or may have needed to leave their children in Germany (Grubb, 1994).

Redemptive servitude disappeared abruptly around 1820, as shown in figure 2.2. According to Grubb, the demise of contract labor was overwhelmingly the result of a growing remittance system. Under the remittance system, family and friends already in America prepaid the cost of passage for those still at home. The cost of passage was nominally cheaper under the remittance system, because passage no longer included the 15% markup charged by redemptioner shippers. Informal lending in the remittance system also had lower monitoring and enforcement costs, due to personal kinship ties.

2.3.3 Prepaid Passage

The system of chain migration through remittances and prepaid passage pervaded nineteenth century emigration. Jerome (1926) asserted that 32% of all immigrants to the United States at the turn of the twentieth century had passage paid by relatives. Records of prepaid passage are relatively scarce, due to the informal

nature of the agreements. Two studies in particular were able to quantify the extent of prepaid passage among emigrants using administrative records.

Schrier (1958) estimated that prepaid passage accounted for 75% of all Irish emigration in the fifty years following the Irish potato famine. Citing an 1854 report from the Colonial Land and Emigration Commissioners, Schrier reported that the Irish emigration had "assumed the character of an organized movement financed almost entirely by remittances from America" (1958: 16). Private remittances were sent to Ireland through a "hodgepodge" of channels, including banks, exchange agencies, shipping firms, and private letters. Cash, passage tickets, and money orders could be sent. In raw terms, the flow of money sent privately from America exceeded the total Irish government expenditure on poor relief by 1.75 million pounds between 1852 and 1872. Prepaid passage accounted for 40% of total remittances.

General remittances, called "American money," were considered a gift to be used for expenses in Ireland such as rent, schooling, or Christmas presents. "Passage money," however, was considered an informal loan to be used only for purchasing passage to America. According to the Irish Folklore Commission and personal interviews conducted by Schrier, a recipient of passage money felt tremendous pressure to use it only for emigration to America. Passage money was to be repaid upon settlement in America. According to Schrier, "After securing work and saving some money, [the immigrant] in turn sent for another member of the family and again the cycle was repeated. In this manner brother followed sister, and sister brother, until entire families had been brought over" (1958: 17).

Coupled with personal letters and remittance money, Hvidt (1975) hypothesized that prepaid passage played a dominant role in encouraging emigration from

Table 2.2: Proportion of Tickets Prepaid in America, by Year and Country.

Year	Denmark	Norway	Sweden
1872-75	–	39.4	–
1877	14.6	–	–
1878	14.2	–	–
1879	12.9	–	–
1880	–	–	–
1881	15.2	–	–
1882	18.3	–	–
1883	26.5	–	50.2
1884	27.6	–	50.0
1885	32.3	–	53.2
1886	25.1	–	34.3

Source: Hvidt (1975: 191-3).

Scandinavia. He estimated the prevalence of prepaid passage for Denmark, Norway, and Sweden, finding that at least one fifth of all Scandinavian emigrants traveled on passage prepaid in America. Hvidt conjectured that prepaid passage was primarily used by family heads who emigrated in advance of a wife and children, though extended family were probably also aided. As did Schrier, Hvidt reported that a prepaid ticket to America was difficult to refuse.

Administrative reports of emigration from Denmark recorded the number of tickets that were prepaid. Starting in 1877, a moonlighting policeman compiled the report every three months. The reports did not cover all emigration from Denmark, but Hvidt thought the figures could be considered representative of the overall total. As depicted in table 2.2, the proportion of emigration tickets that were prepaid in America varied between 13% and 32%, annually. For Norway and Sweden, the proportions were higher, though the data were more scarce. Between 1872 and 1875, Hvidt reported that almost 40% of emigrants who departed from Christiania, Norway traveled on prepaid tickets. Hvidt estimated the role of prepaid passage from Sweden using records of the ten largest emigrant shipping lines,

which handled 80% of Swedish emigration. Referring again to table 2.2, 50% of emigrants traveled on prepaid passage between 1883 and 1885.

2.3.4 The PEF as an Example of Prepaid Passage

With few exceptions, the PEF strongly resembled prepaid passage through the remittance system. First, the design of the PEF as a revolving fund mirrored the cyclical lending often associated with prepaid passage and the remittance system. PEF passage recipients were expected to repay loans after getting settled in their new homes, but the initial fund donors were not repaid. Rather, the remittances financed subsequent lending to additional emigrants.

Second, the terms of repayment were flexible. A maturation date was conspicuously missing from the PEF passage promissory notes. Repayment could be made in cash; "in kind," meaning with produce, grain, livestock, etc.; or in labor on public works projects (Jensen and Hartley, 1992). Debts were eventually forgiven for individuals without means, and there is no evidence of legal action to enforce repayment (Carson, 1998).

Third, PEF lending took place in the context of a closely-tied community. Emphasis was placed on helping fellow Church members escape poverty by emigrating to Utah. At the same time, a sister goal of the PEF was to facilitate rapid immigration of individuals who could help build the economy in Utah.

Two characteristics distinguished the PEF from family-based prepaid passage. The most obvious was maintenance of formal records. Each household receiving PEF passage signed a promissory note with the commitment to repay the loan upon arrival in Salt Lake. In contrast, family lending was largely undocumented.

A second distinguishing characteristic was the intermittent practice of charging interest on loans. It is impossible to know for sure whether interest was charged for familial loans under the remittance system. PEF promissory notes included a 10% rate of interest, however further study of the PEF general ledger is needed to determine the circumstances under which interest was or was not charged.

The combination of cyclical lending, friendly terms of repayment, and sense of community suggest the PEF channeled financial assistance between coreligionists in much the same way that a family might provide assistance to loved-ones still at home. Previous research by Carson (1998) aligned PEF lending with indentured migration, in part because borrowers were able to repay their debts by providing labor for public work projects. However, further review of the institutional detail indicate that the PEF was indeed a variant of family-based lending.

2.3.5 Determinants of PEF Passage Receipt and Repayment

Virtually no records have survived to explain how PEF passage was allocated among potential borrowers. Empirical work by Carson (1998) explored the determinants of PEF passage receipt. Individuals were linked between the PEF general ledger and ship rosters for departures out of Liverpool, England.[4] The data were collected for three time periods: 1854-55, 1864-65, and 1868. Name, occupation, age, marital status, household size, and an indicator for PEF passage receipt were recorded for two thousand emigrants.

[4]Carson did not explicitly name the source of the ship rosters he used, but it is likely he drew households from the European Immigration Index, a precursor to the Mormon Immigration Index.

Carson looked specifically at possible occupational targeting by PEF agents in loan dispersal. Emigrant occupations were classified into six groups: artisans, farmers, textile workers, mechanics, potters, and laborers. Carson compared the distribution of occupations between PEF-financed and self-financed emigrants for each time period, as reported in table 2.3. No pattern was obvious for which occupations received the most aid across time periods, but artisans were generally less likely to receive loans. The demographic patterns in which households received loans shifted over time, with older, larger families being funded in greater proportions in later years. Evidence for whether female-headed households received aid more frequently than those headed by males was mixed. Overall, Carson suggested the PEF focused on helping the "worthy poor" who were long-time members. However, his data did not include a measure of tenure in the Church.

In a separate data set, Carson linked a one in five sample of PEF loan recipients, 1852-1887, to a sample of census records published by J.R. Kearl (1981). The final sample size included 710 heads of household.[5] Loan repayment for each borrower was inferred using the 1877 Indebtedness List. All borrowers on the Indebtedness List were classified as defaulting on their loans. Absence of a name from the List implied the loan had been repaid in full.

Carson came to four main conclusions about who repaid their loans. First, eventual loan repayment increased with the wealth of the borrower. Second, repayment was more likely the longer the person had been in Utah. Third, repayment was less likely the farther the person lived from Salt Lake. Fourth, proximity to Salt Lake had a stronger effect on repayment than wealth. In fact, repayment was higher for individuals living near Salt Lake, even compared to wealthier individuals living farther away.

[5]Approximately 80% of the sampled borrowers could not be linked to the census.

Table 2.3: Occupation Distribution of Male Mormon Immigrants, by PEF Status.

Occupation	**1854-55**		**1864-66**		**1868**	
	PEF-financed	Self-financed	PEF-financed	Self-financed	PEF-financed	Self-financed
Artisans	31	49	34	28	21	19
Farmers	2	6	12	5	5	5
Laborers	48	31	33	47	34	30
Textile Workers	8	6	12	7	16	6
Mechanics	2	1	1	3	3	2
Potters	2	0.4	0	0.4	0	0
None	8	8	8	11	21	39

Source: Carson (1998: Tables 3.1-3.3).

Carson's research lends a light on which factors may have influenced repayment of informal family lending as well. Geographic proximity of the lender and borrower would have lowered enforcement costs. It also seems likely that time was needed to remit in full, because the borrower was amassing set-up costs upon arrival. An important consideration to keep in mind is that Carson measured repayment as of 1877. Some borrowers who were in default in 1877 may have later remitted their loans, particularly those arriving in the 1870s. An additional factor that Carson was unable to include was PEF debt forgiveness. As would be expected from family lending, PEF agents did not enforce debt collection from impoverished individuals.

Both of Carson's lines of research present fascinating insights into the PEF. However, questions arise from his work, including the impact of tenure in the Church on both loan receipt and eventual repayment.

2.4 Understanding the Decision to Emigrate

Hatton and Williamson (1998) discussed the emigration of a household as the agglomeration of three theoretically separable decisions. Household members had to decide *whether* they wanted to emigrate at all and, if so, *where* they wanted to resettle and *when* they wanted to actually make the move. Empirically, only the joint outcome of all three decisions is generally observable in the form of names listed on a passenger manifest with the destination, dates of travel, and country of origin. Even when the passenger manifests are linked to manuscript census records it is impossible to observe when the household began discussing the prospect of em-

igrating. Instead, economic analysis of emigration has been limited to observation of the culmination of months or years of fact finding, debate, and planning.

2.4.1 Macroeconomic Influences on Timing

Emigration from the England and Wales, measured in the number of emigrants per thousand of the total population, peaked in 1854 at 4.9 per thousand and then fell to 1.1 per thousand in 1861. Emigration rose slowly into the 1870s (Baines, 1985, 58-9). Net emigration from the United Kingdom, between 1871 and 1913 totalled 5.6 million persons, with sharp year to year fluctuations. The overall level of emigration was characterized by a "long swing" between the early 1880s and the years immediately preceding WWI. At both endpoints, net emigration reached about five or six per thousand, dropping below two per thousand at the turn of the century (Hatton, 1995). Emigrants from the British Isles overwhelmingly migrated to other English-speaking countries. Fifty-four percent moved to the United States, twenty-five percent to Canada, and seventeen percent to New Zealand and Australia combined (Hatton, 1995).

Push-pull models of emigration attempt to tease out whether migrants were primarily trying to escape poor conditions at home or whether the decision was dominated by the lure of favorable prospects abroad. Hatton (1995) and Hatton and Williamson (1998) argued that push-pull analysis lacked a clear theoretical framework for comparing differential effects of push and pull. Rather, the push-pull analysis merely discussed whether the coefficients on the variables are numerically larger or statistically more significant for conditions at home or in the destination countries. To answer their criticism, they suggested a structural model of migration be developed.

Hatton and Williamson pointed out that previous research had not satisfactorily explained the differential effects of wages and unemployment rates on migration. Some studies used only one or the other measure. Of the work that included both, the effect of the unemployment rate tended to dominate that of wage rates, yet no one had given a theoretical justification for the result. They proposed both that relative wages ought to be included rather than individual levels and that employment levels should also be included.

Hatton and Williamson criticized the "friends and relatives" effect reported in many studies. Evidence from previous literature suggested that the lagged dependent variable (emigration per thousand for the previous period) had a large, statistically significant effect on migration. The coefficient on the lagged dependent variable had been described as a measure of the help new emigrants received from recently emigrated friends or relatives. They explained the lagged dependent variable was better understood as a reflection of the constant updating of potential emigrants' expectations about their outcomes in the new country. They further proposed that a better measure of the "friends and relatives" effect would be the migrant stock in a country.

Hatton and Williamson developed and estimated a structural model to determine how economic conditions at home and abroad affected international immigration. Analysis was based on annual counts of emigration from the United Kingdom per thousand residents between 1870 and the start of World War I. While the results were qualitatively similar to previous research, the structural model explicitly incorporated expectations and uncertainty in the migration decision and correctly predicted relative magnitudes of the various affects.

The structural model assumed potential emigrants compared expected utility streams at home and abroad, where utility was the natural log of annual income. More weight was given to current conditions. Even if the net present value of emigration in a given year were positive, the net present value of waiting an additional year might have been even higher. The difference between the two values was assumed to follow an AR(1) process.

Uncertainty was incorporated into the utility function through the expected income, which depended on wages and the employment rate. Wages were assumed to be known, and employment followed a binomial distribution. Relative wages were measured as the ratio of wages at home to those abroad. Both levels and one-period changes for relative wages and employment rates were included. The lagged dependent variable and migrant stock were entered separately.

The model predicted that improvements in conditions abroad would tend to increase emigration, while improvement at home would tend to decrease it. The effect of wages at home and abroad were predicted to be equal in magnitude and opposite in sign. The model predicted that the effect of the one-period change would be larger than the effect of the levels for all variables. The model further predicted that the effect of employment rates abroad would be larger than at home.

Overall, the predictions held true. With few exceptions, the estimated coefficients followed the patterns in sign and magnitude as suggested by the model. Long-run changes in emigration levels (the "long swing" in annual migration from the UK) were affected by three main factors. Higher relative wages in the destination country tended to increase emigration. Growth in the source country of the emigrant-aged population also tended to increase emigration. Finally, the migrant stock in the destination country tended to increase flows to that location.

Short-run, year-to-year fluctuations in emigrant flows were significantly affected by changes in employment rates in the source and destination countries. The more favorable the destination country appeared relative to the source country, the higher the number of emigrants. Surprisingly, when income increased in the source country short-term emigration increased. The implication is that the money needed to finance passage had a greater effect than the change in relative wage. As cost of passage decreased, emigration also grew.

Questions remain as to the mechanism by which "friends and relatives" affected potential emigrants still at home. The lagged dependent variable had a positive coefficient. At the same time, the total number of immigrants in the destination country also had a positive coefficient. Hatton and Williamson postulated that the presence of other migrants in the destination country who came from the same source country had a dual effect of increasing the potential emigrants' information about migration and decreasing the cost of migrating.

2.4.2 "Gathering" and the Timing of Mormon Emigration

Records of the Mormon pioneers provide a unique opportunity to separate the emigration process into two, albeit not three, distinct stages. Stage one consisted of both the decision to move and the selection of the destination. Completion of this step was manifested at baptism, because adult baptism indicated not only conversion to the faith but also a commitment to emigrate to a gathering place specified by Church leaders. From 1847 onward, the selected destination was the Rocky Mountain west. Because of the second meaning embedded in the decision to be baptized, records of the convert baptism provide a "general registry" of people declaring their intention to emigrate. Stage two consisted of actually making the

move, in other words boarding a ship bound for North America. Comparison of the dates of baptism and emigration at the individual level allows for a more nuanced examination of the timing of emigration than has been possible using traditional sources.

Emphasis on gathering had implications for financial records of the PEF. The PEF was designed to be perpetually replenished by repayment on outstanding loans, but annual conversion rates world-wide tended to outstrip PEF remittance rates in Utah. To extend the reach of the PEF, Church leaders maintained ongoing campaigns to collect donations. Total remittances and total donations, annually, have not been found in the archival collection of PEF records. However, the total amount available to be distributed in a given year can be estimated with the sum of all loans for the same time period. It seems unlikely that PEF agents ever held back a portion of the available funds in any given year, because converts were encouraged to emigrate as soon as they could. Sporadic increases in intensity or success of the fund-raising campaigns would have been reflected in spikes in the amount loaned for the corresponding season.

2.5 Characteristics of Immigrants

Characteristics of immigrants to the United States changed throughout the nineteenth century. In the first part of the century, emigrants tended to travel in family groups led by farmers and artisans. Some sought refuge from wars or better democratic rights. They were worried about future changes in opportunities for their children in Europe. Many of the early century emigrants settled on the North American frontier, perhaps attracted by promises of free farmland, and they

Table 2.4: English and Welsh Immigrants Aged 15 or Older According to Traveling Companions, 1831

	Females	**Males**
Traveling alone	166	1,112
Traveling with families	942	1,070
Total	1,108	2,182

Source: Erickson (1994: 143).

generally emigrated from northwestern Europe (Erickson, 1994). As industrialization spread across Europe, the composition of emigrant streams changed. In the second half of the century, emigrants were primarily young, unskilled, and single. The "land of opportunity" attracted individuals who had not yet made major investments in their own human capital. Immigrants still came from northwestern Europe, but they also came from countries previously under-represented, such as Italy (Erickson, 1994; Chiswick and Hatton, 2003).

2.5.1 Family Migration

In 1831, emigration from the British Isles was dominated by family groups. As can be seen in table 2.4, half of all English and Welsh emigrants traveled with a spouse, with or without children. A tenth traveled with extended family groups consisting of in-laws or three generations of family members. Sixteen percent traveled as single parents with children. In the last case, most were probably joining husbands who had emigrated in advance of the rest of the family (Erickson, 1994). As shown in table 2.5, family migration was also common among the Scots, Irish, and Scandinavians. In the second half of the century, family groups were much less prevalent. The modal emigrant was a single, unskilled, young adult male. However, a significant minority traveled as couples with young children.

Table 2.5: Immigration According to Traveling Companions, by Nationality.

Nationality	**Year(s)**	**Percent Traveling in Families**	**Mean Size of Families**
English and Welsh	1831	76.6	4.40
Scots	1831	65.5	4.26
Irish	1831	60.5	3.52
Dutch	1830-1839	68.8	–
Dutch	1871-1880	76.4	–
Swedish	1871-1880	42	–
Danish	1871-1880	43	–

Source: Erickson (1994: 144).

Upon arrival in the United States, the rural West seemed to draw large family groups. Research by Ferrie (1999) examined immigrants who arrived in New York in the 1840s. The immigrants were identified in the 1850 census, and their internal migration patterns were studied. Whereas previous samples were able only to track people who stayed in the same geographic area, Ferrie's sample included immigrants who relocated between states. The sample was nationally representative and included young people. Previous research either focused on a limited geographic region or excluded households without children, therefore eliminated households headed by young adults.

Ferrie found that the rural west was more likely to attract immigrants who arrived with the largest families. One possible explanation is that farming–especially farming virgin land–required the labor of many people, so large families were well-suited for the endeavor. An alternate explanation is that larger family groups may have been wealthier, and therefore better able to finance overland travel. Ferrie also found that the immigrants who were oldest upon arrival were the most likely to eventually move to the west.

Families traveling together under the leadership of skilled workers also characterized the Mormon migration. Like the pioneering free settlers of the previous half-century, Mormon immigrants hailed from northwestern Europe. Mormon immigrants were more likely to be from the British Isles than from elsewhere in Europe, with substantial populations emigrating from Scandinavia in later years. The Salt Lake settlers also resembled westbound emigrants generally, continuing the pattern observed by Ferrie. One exception to the similarities was the choice to settle in the Rocky Mountain West. Church leaders specifically sought out a geographically isolated destination. By 1847, much of the midwest had been settled, though, admittedly, the region was still largely rural. Because the unsettled frontier had been pushed further west, the overland trek was longer for the Mormon pioneers than for their predecessors.

2.5.2 Immigrant Skill Level

In the early 1800s, immigrants to the United States were more likely to be skilled and older than their counterparts in the later half of the century. In 1831, fewer than eleven percent of new arrivals were laborers. Table 2.6 compares the skill levels of English and Welsh male immigrants in 1831 to the skill levels reported in the British census and of all arrivals to the United States. About half of the English and Welsh immigrants were craftsmen or industrial workers. In contrast, these occupations were listed for only a third of the men in the census and a fifth of all immigrants to the U.S. The prevalence of workers skilled in preindustrial trades may have been due to changes in employment opportunities resulting from the industrialization of Europe. As craft workers anticipated changes in the landscape

Table 2.6: Occupations of English and Welsh Male Immigrants from Four Ports Compared With the British Census and All Arrivals in United States Ports in 1831 (percent).

Occupations	**English and Welsh Immigrants**	**Census of England and Wales**	**All United States Arrivals**
Agriculture	24.6	33.8	31.1
Labor, including mining	11.3	16.7	10.8
Service	2.1	4.0	6.7
Crafts, without mining	33.1	21.6	18.7
Industry	16.5	13.2	2.3
Commerce and Professional	12.4	10.7	30.4
Total	100.0	100.0	100.0

Source: Erickson (1994).

of opportunities for themselves and their children, emigration may have become more attractive (Erickson, 1994).

By the end of the century, the distribution of occupations among immigrants had become decidedly less skilled, as can be seen in table 2.7. The proportion of immigrants who were unskilled laborers increased from a tenth in 1831, to a quarter in 1877-80, and a third in 1881-90. In contrast, the proportion employed in farming and preindustrial occupations decreased.

Changes in the skill distribution of immigrants can also be understood through changes in the age distribution. The age distribution of immigrants included more adults age 40 and older in 1831 than in the last quarter of the century and, the proportion of children was dropping over the same period. As seen in table 2.8, about a third of English, Welsh, and Scottish immigrants were under the age of 15 in 1831. At the end of the century, the proportion had dropped to about a

Table 2.7: Occupation of adult male passengers from Great Britain, 1877-1900 (percent).

Occupation	1877-80	1881-90	1891-1900
Farmers	8.3	5.4	5.2
Agricultural Laborers	9.6	15.4	14
Laborers	24.6	32.4	15.2
Servants	0.3	0.3	0.9
Occupations with relatively little technical change	13	14.2	18.2
Occupations with relatively great technical change	12.8	10.8	13.3
White Collar	24.4	18	27.7
Other Occupations	7.1	3.4	5.6
Total	100.1	99.9	100.1
Proportion Not Stating Occupation	16.2	18.1	23.2
Total adult male emigrants (1,000s)	276.3	1174.8	783.2

Source: Baines (1985: 77-78).

fifth. The changes were due to a shift towards the immigration of single young adults. Young adult immigrants moved before making major investments in their human capital. By postponing training until after immigration, if ever, returns from moving could be maximized.

2.6 Conclusion

Research on the PEF has close ties to the questions of how emigrants timed and paid for their relocation to a new country. Religious identity, while conspicuous, did not intrinsically make Mormon emigrants atypical of their contemporaries. In terms of observable economic and demographic characteristics, Mormon emigrants appear to have been similar to other family-based emigrants, and they appear to have followed in the tradition of religion-based community-building that was established on the American frontier in earlier decades. One characteristic unique

Table 2.8: Age Distribution of Immigrants by Nationality (percent).

Nationality	**English and Welsh**	**English**	**Scots**	**Scots**	**Irish**	**Irish**	**Danes**
Year(s)	1831	1873-1898	1831	1873-1898	1831	1873-1898	1868-1900
Age 0-14	35	21	30	21	21	13	20
Age 15-39	53	67	60	67	69	80	68
Age 40+	13	12	10	11	10	7	10
Not Stated	–	–	–	–	–	–	2
Total	101	100	100	99	100	100	100
Sample Size	6,229	1,206,833	589	268,070	2,811	1,302,266	172,073

Source: Erickson (1994: 142).

to Mormon emigrants was the doctrine of "gathering to Zion." This doctrine makes it possible to use observed year of convert baptism as an estimate of when an individual decided to emigrate.

The PEF essentially formalized prepaid passage among members of the Mormon religious community. The PEF does not appear to have altered the terms of informal lending in any substantive way, except in the establishment of centralized record-keeping. By institutionalizing passage assistance, the PEF became a repository for household-level records of borrowing and repayment. The combination of detailed records and friendly loan terms make the PEF an excellent source for research on how prepaid passage affected emigrants.

CHAPTER 3

ORIGINAL DATA COLLECTION

3.1 Introduction

Emigration records were linked with baptismal and PEF records to create a sample of 2,259 heads of household. The final data set includes years of birth, baptism, and emigration; pre-migration occupation, where available; gender; household size at time of emigration, including counts of household members of various gender-age groups; and the amount of the PEF loan received, if any.

3.2 Latter-day Saint Baptismal Records

Prior to 1906, membership records of The Church of Jesus Christ of Latter-day Saints were maintained by individual congregations, called branches. Volunteer clerks recorded the name, birthday, and birth place of each person who was baptized, along with the date and location of the baptism and the name of the person who performed the baptism. Each convert was required to be baptized by an authorized member of the Church, regardless of any previous baptism in another church. Membership records occasionally included changes of address and significant events, such as marriages, deaths, and births of children. For men, certain church assignments–called priesthood ordinations–were sometimes recorded. A number of entries also include the names and birthplaces of the parents of the convert, regardless of whether the parents themselves converted. The early branch records have been gathered up into the holdings of the Family History Library (FHL). Microfilm copies of the manuscript membership records fill more

than seventy-five reels. While the FHL holdings are not complete, they are an excellent (and the only) centralized primary source of information on nineteenth century LDS baptisms (Doxey, 2003).

A secondary source for membership records is The Index to Early Church Records, commonly known as the Minnie Margetts Index (MGT) in honor of the FHL employee who compiled it in the mid-twentieth century. The MGT is essentially a transcription of membership records, alphabetized by the members names. Margetts created a separate card for each individual, and all membership entries referring to the same person were grouped onto a single card where possible. Each person's card included a transcription of the dates, locations, and names as written in the manuscript records, as well as the citation of the particular volume from which the entry was drawn. In addition to the British membership records, the MGT includes limited entries from the Eastern United States, Utah, and Samoa. All cards from all sources are "roughly" alphabetized in a single collection, available as a series of sixteen reels of microfilm. The intended use of the MGT was as a tool for individual genealogical research, but the level of detail included makes it a prime source for academic research as well. With support from the NSF, an abbreviated electronic copy of the MGT was manually transcribed for this project. The electronic copy was used to link baptismal records with emigration records. The electronic copy was also used to estimate the proportion of total baptisms for which records survived.

3.2.1 Manual Transcription of the MGT

All records of baptisms occurring prior to 1900, in the British Isles were manually transcribed into a spreadsheet for this project. The transcription included the

complete name of the person who was baptized, the years of birth and baptism, and quality indicators for legibility of the MGT film. After the initial transcription, the records were further refined in three stages. In the first stage, records were kept only if the baptism occurred between 1837 and 1890, inclusive, and the record was not missing year of birth. In most records, the precise years of birth and baptism were recorded, however a portion of the records listed only one of the years. If the year of birth was not reported, it could be inferred as long as the age at baptism was reported along with the year of baptism. Similarly, year of baptism could be inferred if year of birth and age at baptism were recorded. Year of birth was inferred for approximately one third of the records. However, nearly all transcribed records (99.6%) reported the exact year of baptism.

In the second stage, baptismal records were eliminated from the electronic file if they indicated an obviously erroneous age at baptism. Because Latter-day Saint doctrine precludes the baptism of children before the age of eight, a record was assumed to be faulty if the year of baptism was less than seven years after the year of birth. Records exactly seven years apart were included to allow for benign errors in recording the birth year for a child. The apparent baptism of an extremely elderly individual was assumed to be an error if the year of baptism was one hundred or more years after the year of birth. For entries removed because of either extreme youth or extreme age, it seemed likely that an error had been introduced in the creation of either the MGT or the electronic transcription.

In the final stage, duplicate records for the same person were identified and the surplus copies were eliminated. A card could have been duplicated within the MGT if it were photographed more than once in the microfilming process. An individual could have two or more cards if Margetts did not properly link multiple

Table 3.1: Records of Baptisms in the MGT Transcription, By Decade.

Years	**Total Number of Baptisms**	**Average Age at Baptism (years)**	**Percent Inferring Birth Year**
1837-1840	437	31.75	15.33
1841-1850	10,025	29.54	52.15
1851-1860	8,434	26.51	22.52
1861-1870	2,623	21.55	16.58
1871-1880	983	22.99	10.07
1881-1890	1,328	26.43	7.38
All Years	26,324	27.19	32.84

manuscript records for the same person. Surplus records were eliminated only if the names and years were exact duplicates of another record. Nothing was done to address possible inconsistency in nineteenth century orthography or inaccuracy in recording age that could have lead to the creation of more than one card for the same person.

After eliminating entries with errors, the electronic transcription of the MGT for this project consisted of 26,324 baptismal records for the British Isles, between 1837 and 1890, inclusive. Annual baptisms in the transcription ranged in volume from 60 to 3,300 per year. The average age at baptism for each year varied between 20.0 and 33.25 years of age. The variation seems to be driven by the proportion of baptisms of children (ages 8-14 years). It is unclear whether the proportion of children was driven by changing demographics or record-keeping practices. Table 3.1 displays the total number of baptisms, average age at baptism, and percent of entries inferring birth year, by decade.

3.2.2 Completeness of the Baptismal Records

The reason for creating the electronic transcription of the MGT was to identify the baptismal dates of Mormon emigrant. It is important to have a reasonable idea of what proportion of all baptisms are included in the transcription. The analysis needed to find the proportion also yields an estimate of the how many British baptismal records have survived since the 1800s. The MGT transcription inclusion rate, and therefore the baptismal record survival rate, is calculated by comparing the number of records in the transcription to administrative records of the British Mission (the ecclesiastic organization for the British Isles). This comparison suggests the transcription includes about a quarter of all baptisms occuring in the British Isles prior to 1890. The proportion varied by year, but no systematic patterns were observed in the variation.[1]

While it is somewhat disappointing to have access to only a quarter of all baptisms, considering the conditions under which the records were kept and stored it is remarkable that so many survived. Thge records were kept by a migrant population led by lay clergy. The omissions of baptisms from the MGT transcription are primarily the result of four main factors.

1. Exclusion of baptismal records listed in the MGT where year of birth was not recorded and could not be inferred.
2. Loss of records due to inadequate preservation on the nineteenth century frontier. Notes in the MGT indicate when portions of a branch record were rotted away or difficult to read. External sources indicate that entire volumes

[1] A detailed explanation of how the record survival rate was calculated is presented in appendix A.

of branch records have been lost or otherwise destroyed in the years (and miles) since they were first recorded in the British Isles.

3. Omission of records due to lack of training for (or diligence of) volunteer branch clerks. A particularly poignant commentary was found in the records of the Steeple Ashton, Wiltshire Branch, "If the [books are] opened and the dead [are] judged out of the 'things that are written in the Books,' we hope that our 'Recording Angel' has been more attentive to his duty than the Secretaries of this Branch have been" (as quoted in Doxey, 2003, p. 114).
4. Incomplete indexing of the FHL collection by Margetts.

Incompleteness of the MGT transcription is only a problem for this project if the individuals for whom baptismal records were lost were systematically different than those for whom records survived. Fortunately, there is no evidence, a priori, to indicate that baptism records of converts with particular unobservable traits were more likely than others to be lost. For instance, there is no documented evidence that baptisms were added to the records after converts "proved" themselves to be devout. Though unlikely, possible bias in which records survived may be present in terms of geographic region of baptism. Bias associated with branch or region of baptism could not be evaluated at this point, because location of baptism was not transcribed from the MGT.

When examined in their historical context, the 25% inclusion rate ought to be considered respectable. The records were kept by transient missionaries and volunteer members who were, themselves, preparing to emigrate. Furthermore, in order for the record books to be included in the FHL collection, they had to survive transportation across the Atlantic ocean, overland travel across the eastern half of

North America, and storage in a frontier community and during intervening 150 years since they were originally made.

3.3 Mormon Immigration Index

The Mormon Immigration Index (MII) is a compilation of all surviving records of trans-oceanic emigration by Mormon converts, from 1840 to 1890. The main sources of information are passenger lists found in Church emigration records, including those previously indexed in the European Immigration Index. Other sources include announcements published in Salt Lake City newspapers and personal recollections amassed from individual diaries and biographies. In addition to lists of passengers names, the MII incorporates narrative accounts of many voyages. The accounts are gleaned from passengers diaries, newspaper articles, and occasionally captains logs. Emigration information is recorded for nearly 93,000 Mormon emigrants, of whom at least 46,829 were residents of the British Isles prior to boarding a ship. Figure 3.1 plots the number of emigrants from the British Isles listed in the MII, by year of emigration. An electronic version of the MII was obtained from the Church History Library of The Church of Jesus Christ of Latter-day Saints.

3.3.1 MII Origin

Eighty-three percent of the MII records include the place of origin. Among emigrants from the British Isles, about two-thirds of the records include some listing of the city or shire in which the individual last lived. The locations were grouped

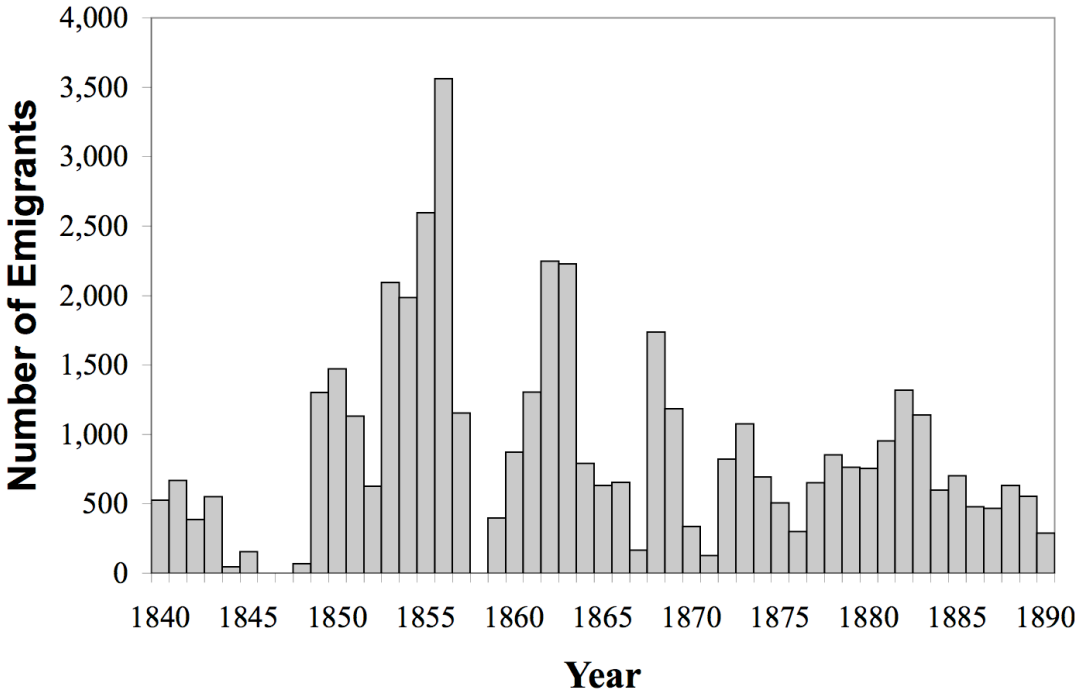


Figure 3.1: MII Annual Emigration from the British Isles

into regions, as reported in table 3.2. Among British emigrants specifying a detailed place of origin, 72% were spread fairly evenly between Wales, Midlands, the Northwest, and Scotland. Emigrants were less likely to be from the South, except London and surrounds, or the Northeast. An even smaller number hailed from Ireland, probably because of the strong Catholic influence there.[2]

Coding for region of origin utilized a combination of manual and automatic comparisons. First, the passenger origins were collapsed down into a list of 3,593 distinct locations for manual review. Foreign locations (anywhere outside the British Isles) were noted, and the remaining locations were compared to a gazetteer of historic counties (Gazetteer of British Place Names). Whenever a listing appeared to be misspelled, the correct spelling (for the place name used to code the location) was then recorded for later review. In a few cases, the same location name was

[2]For a listing of how counties were separated into regions refer to appendix B.

found within two or more different counties. If the different possible matches were within the same region, then the location could be properly coded. If the different possible matches were not within the same region, then the location could only be coded as "unspecified British Isles." The manual review succeeded in coding 80% of the locations within the British Isles and 90% of the foreign locations.

A semi-automated process supplemented the manual review. Computer code was created for this project using Stata. String comparisons identified locations that included the names of historic counties or particular foreign countries. The results of the automated key name review confirmed the manual review in all but a handful of cases. Stata was also used to compare the country of origin to the port of departure. Liverpool, England was the most common port of departure for all British and European converts, so port location did not necessarily indicate national origin. However, departure outside the British Isles did suggest foreign origin. Departure port proved essential in determining origin for individuals emigrating from former British colonies, such as Australia and South Africa, where the locations were often named for places in the British Isles.

All but 640 of the original 3,600 locations were coded through the combination of manual review, key name search, and port of departure. The coded locations were used to identify 46,829 emigrants as being from the British Isles. Among the British emigrants, the region of origin was further specified for 64%. The remaining 640 locations were either too obscure to be listed in the gazetteer or too poorly spelled to allow conclusive determination of region.

Table 3.2: MII County of Origin, British Isles

Region	Freq.	Percent
London &Home Counties	3,398	7.26
Southwest	1,503	3.21
South & East	1,888	4.03
Wales	5,674	12.12
Midlands	5,372	11.47
Northeast	1,108	2.37
Northwest	5,468	11.68
Isle of Mann	41	0.09
Ireland	630	1.35
Scotland	5,029	10.74
Unspecified British Isles	16,718	35.70
Total	46,829	100.00

Table 3.3: MII Gender Distribution by Age at Emigration, British Isles.

Age at Emigration	Adult (15+ years)	Child (0-14 years)	All Ages
Male	14,444	7,889	22,333
Female	15,367	7,830	23,197
Unknown	540	759	1,299
Total	30,351	16,478	46,829

3.3.2 MII Gender and Household Composition

Slightly more women than men emigrated from the British Isles among the Mormon emigrants, as shown in table 3.3. Thirty-five percent of MII emigrants from the British Isles were under age fifteen. Among adults, the average age was 33.3 years (standard deviation 13.41). In contrast, the typical person to arrive in the United States in the nineteenth century was a young adult, probably traveling alone or with a spouse, and two thirds were male (Ferrie, 1999). The relative parity of the two genders among Mormon emigrants can be explained by the high prevalence of family migration. MII emigrants from the British Isles were much more likely to travel with multiple family members than their secular contemporaries.

Table 3.4: MII Size of Emigrating Household by Gender of Head, British Isles.

Number in Household	**Number of Male Headed Households**	**Number of Female Headed Households**	**Number of Households, Total***
1	5,434	4,339	9,981
2-4	4,329	1,816	6,291
5-9	2,332	487	2,860
10+	121	11	136
Total	12,216	6,653	19,268

* Includes households for which gender of the head could not be determined.

Two thirds of MII emigrants from the British Isles traveled with two or more relatives. Table 3.4 reports the distribution of households by size and by gender of the household head. Among those traveling with relatives, one quarter were led by female household heads. The presence of so many female-headed households may be somewhat misleading, because the MII did not record family relations across different voyages. The marital status listed for the women suggests that a large proportion, if not the majority, of the female-headed households were following husbands who had emigrated earlier. One third of female household heads listed their marital status as "wife," 22% listed "widow," and the remaining 45% did not record marital status.[3] The claim that families were emigrating in different voyages, and perhaps different years, cannot be proven using the MII alone. I have received a modest grant to determine whether each wife eventually rejoined her husband in Utah. Alternatively, a husband may have remained permanently in the British Isles.

[3]There are 2,314 female-headed households of two or more emigrants. Wife is listed as the occupation for 772 of female heads. Widow is listed for 500 female heads.

Determining Gender of the Emigrant

Gender was not uniformly recorded in the MII, so it had to be inferred for this project using a variety of criteria. The most commonly utilized criteria for inferring gender was the given name of the passenger, because most given names were clearly associated with one gender. A small percentage of passengers had two given names with contradictory gender implications, and their names were manually reviewed. In most contradictory cases, the passenger had a feminine first name and a masculine middle name, such as "Ann Jeffs Ladbrook," from Warwickshire. It was determined that the masculine middle name was most likely a maiden name, and the passengers were coded as "female." The given name criteria inferred gender for 96% of passengers.

Another criteria was based on the use of gender-specific titles, such as "Mrs." or "Mr." This was particularly important for women listed as "Mrs. So-and-so" who would be coded as male using the given name criteria. Two titles which were somewhat unique to Mormon emigrants were "Bro." (short for "Brother") and "Sister." The titles, "Brother" and "Sister," did not indicate a direct sibling relationship between individuals. Rather, they were used interchangeably with "Mr." and "Mrs." or "Miss." The familial titles further illustrate the sense of camaraderie and loyalty felt among Church members. Fewer than 1% of passengers had gender inferred using solely the title criteria. However, the title criteria was applied to all passengers, in an effort to ferret out possible contradictions.

Gender was occasionally inferred using marital status or gender-specific occupation. A passenger was inferred to be a woman whenever the occupation was listed as matron, widow, wife, or spinster. A passenger was inferred to be a man whenever the occupation was listed as son or gentleman. The listed "occupations" were

Table 3.5: Criteria for Coding MII Gender, British Isles.

Criteria	Number	Percentage
Given Name	45,032	96.16
Gender-specific Title	73	0.16
Occupation	288	0.62
Hand Review	137	0.29
Indeterminant	1,299	2.77
Total	46,829	100.00

not informative about an individual's likely income, but they were very helpful in determining gender. Two gender-specific occupations, seamstress and warehouse man, were also used to infer gender. In all, just over half a percent of passengers from the British Isles had gender inferred using the occupation criteria.

The remaining passengers without a coding for gender were manually reviewed. Several common abbreviations were found for masculine names, such as "Wm." for "William" and "Chas." for "Charles." Unfortunately, several passengers had incomplete or indeterminant names that made it impossible to code gender. Table 3.5 summarizes the criteria by which gender was inferred for all MII emigrants from the British Isles.

Identifying the Household Head

The MII identified emigrants traveling together as a family group, based on the records from which the MII was drawn. Many MII records were transcribed from the British Mission Emigration Index (BME). The criteria used by the BME indexers is no longer documented, because the BME was created as starting points for genealogists who would eventually reference the original records. Anecdotal experience by the researcher responsible for creating the MII database, Blaine Bake, suggests the familial relationships may have been observed directly in some cases,

Table 3.6: Criteria By Which Household Head Was Determined.

	Original Criteria (exception for men under 25)	**Alternate Criteria (exception for men under 20)**
Oldest person is male head	7975	7975
Oldest person is female head	4887	4887
Male traveling with slightly older female (male head)	1063	1082
Older male traveling with mother (male head)	128	128
Young male traveling with mother (female head)	513	492
Ages not reported (MII family group head selected)	301	301
TOTAL	14,867	14,865

but it is likely that relationships were often inferred–as commonly done with passenger manifests–based on surname, gender or first name, and ages or chronological order of listing (*Bake, personal correspondence*).

Within each family group, the MII designated the household head. It appears that the household head was generally the olest person in the household, regardless of gender. Ignoring gender sometimes meant a woman was identified as the family group head if she was traveling with a slightly younger husband. For this project, a detailed algorithm was developed to identify the head of household. Figure 3.2 depicts the logic used for the algorithm. The household head was required to be at least fifteen years of age (at the time of emigration). In general, the household head was defined as the oldest male. An exception was made for a young man under twenty-five years of age, traveling with a woman at least fifteen years his senior. Under the exception, the older woman was presumed to be the true head of the household, and probably his mother.

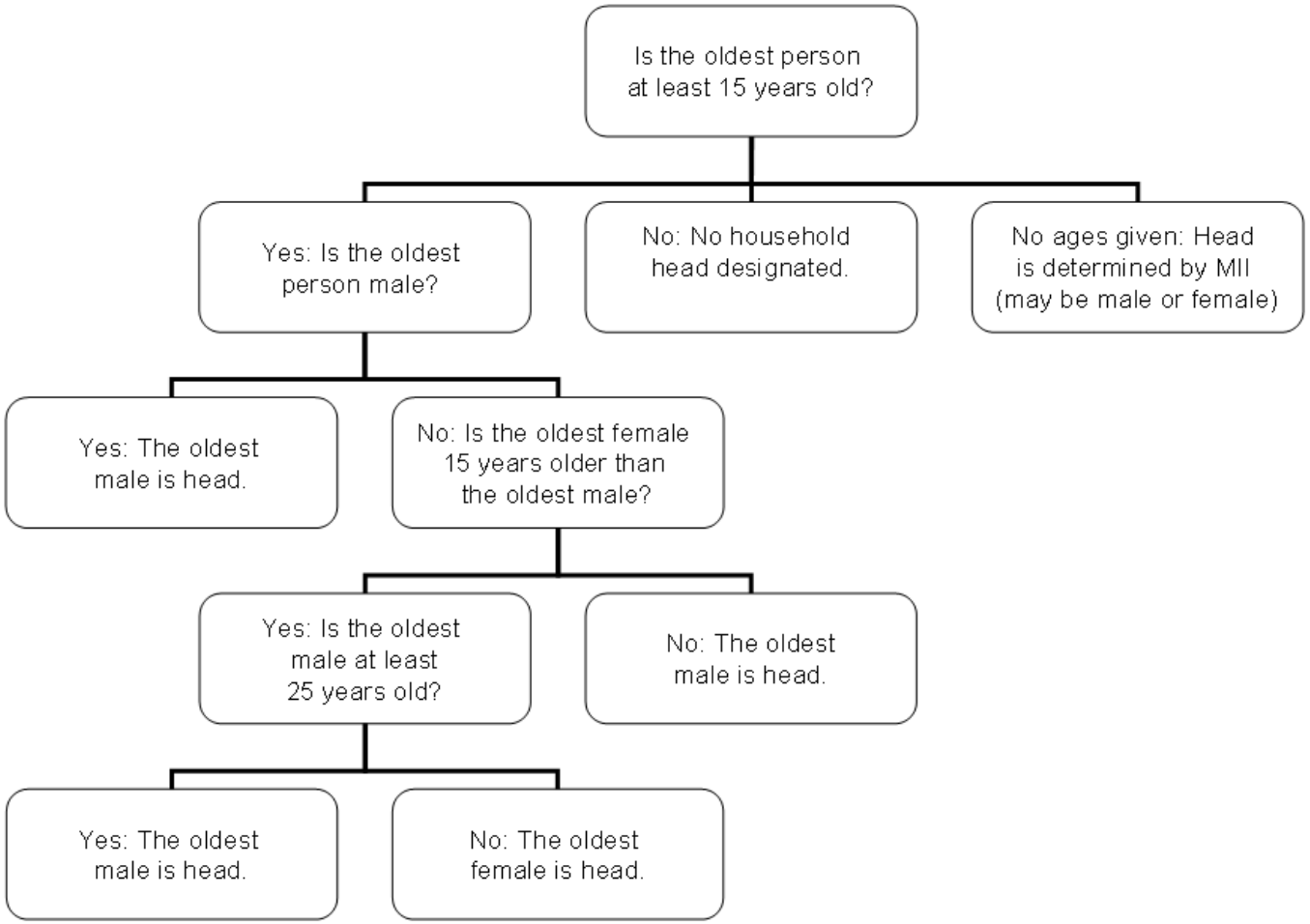


Figure 3.2: Decision Tree for Selecting Household Head.

Most heads of household were determined as the eldest person in the household, as reported in table 3.6. An exception was made for households not reporting individuals ages, because it was impossible to determine who was oldest. When age was not reported, the MII family group head was chosen to be the household head. With regard to the maternal-head exception, fewer than 4% of households had a mother traveling with an older teen or young-adult son. To test possible sensitivity to the selection of age twenty-five as the cutoff, the process was repeated using age twenty. Fewer than two dozen households were affected by the change in cutoff age for the son.

3.3.3 MII Occupation

Occupation was recorded in the MII for 40% of British emigrants, age 15 years and older. In all, 1,100 distinct occupations were listed, though many listings varied only slightly in spelling or spacing.[4] The large number of occupations necessitated adoption of some sort of classification system. The categorization advocated by Alan Armstrong (Armstrong, 1972) was selected for this project, and occupations were grouped into classes according to skill and socio-economic level: professional, intermediate, skilled, semi-skilled, and unskilled.

The Armstrong system follows the 1951 Registrar General's occupation classification system for British census returns, with a few minor exceptions. The Registrar General published hundreds of occupations, each of which were coded according to industry and social class. Of particular relevance to this project, the Registrar General's list included occupations from the nineteenth century that

[4]For example, "Cabinet Maker" and "Cabnet Maker" represented the same occupation but constituted two distinctly spelled occupations to be coded.

had become obsolete by 1951. The obsolete occupations were included so that retired individuals who had worked in the 1800s could be coded according to their pre-retirement occupations. Both the Registrar General and Armstrong systems elevate an individual's classification if the individual had one or more employees, though the specific criteria differ between the two systems. In the MII, emigrants did not list whether they had any employees, so this difference is irrelevant. The Armstrong system also differs from the Registrar General in the classification of merchants, dealers, and retail shopkeepers as skilled rather than intermediate. Otherwise, the two systems are identical.

Nearly all MII occupations were coded for this project using an electronic list created by Jason Long and based on the Registrar General's publication.[5] The distribution of occupations, by gender is reported in table 3.7. Of particular note is the absence of occupation class for vast majority of women. Occupation was simply not recorded for many women in the MII. Where an occupation was listed, the listing almost always indicated her marital status, rather than her type of employment. Entries such as daughter, widow, wife, or spinster were common. Regardless of whether the listed "occupation" was a statement of marital status or simply left blank, such individuals were classified as "unidentified occupation."[6] The same classification was given to men for whom no occupation was listed.

[5]The author expresses sincere thanks to Jason Long for generously sharing his files and expertise.

[6]Spinster was recorded for 3,000 women, second in frequency only to wife, with 3,300 entries. Both are coded as missing occupation. Technically, spinster referred both to a woman's marital status and to an occupation in the 1800s. The primary definition found in the OED is "A woman (or, rarely, a man) who spins, *esp.* one who practises spinning as a regular occupation." Usage of the term as an occupation is cited as late as 1836 and 1910. However, definitions 2a and 2b indicated the familiar modern usage of spinster as referring to an unmarried woman, with usage of the term as a marital status throughout the 1800s. The interpretation of spinster as a marital status, rather than an occupation, was selected for this project because it seemed unlikely that 3,000 women all had the same occupation.

Table 3.7: MII Occupation Class for British Emigrants 15 Years and Older.

Armstrong Class	**Male**	**Female**	**All***
Professional	53	0	55
Intermediate	863	91	995
Skilled	5,390	411	5,908
Semi-skilled	439	20	466
Unskilled	2,236	71	2,384
Unidentified	5,463	14,774	20,543
Total	14,444	15,367	30,351

* Includes households for which gender of the head could not be determined.

A distinctive characteristic of MII emigrants from the British Isles was the large proportion trained in skilled occupations. Of the professionals, about half were lawyers. Other professional occupations included surgeon, chemist, accountant, civil engineer, and surveyor. Examples of intermediate occupations included clerks, school masters, and clothiers. Farmers were also classified as intermediate, and farmers made up 70% of all men and nearly all women in the intermediate class. Other occupations of women in the intermediate class were governess and bookkeeper.

Skilled occupations were by far the most common classification for both men and women. The most common skilled occupations for men included miner, collier, shoemaker, weaver, and tailor. Other common occupations for men included baker, blacksmith, carpenter, engineer, joiner, and mason. Most women in the skilled class had unique occupations not shared by other emigrants, such as bonnet sewer, lace mender, or thatcher. The most common occupations were weavers (20%) and seamstresses or dressmakers (16%). A somewhat problematic aspect of the Armstrong system is that servants and domestics are coded as skilled, accounting for 23% of women in the category (95 women, total). It is somewhat puzzling as to why a domestic servant would be grouped with a blacksmith or a weaver, rather

than with an unskilled laborer. However, the classification is kept in order to be consistent with Armstrong's guidelines.

Semiskilled occupations for men included brick maker, carter, dyer, farm laborer, shepherd, and wool comber. Laundress and housekeeper were common among semiskilled women. Nearly all unskilled workers were listed as laborers. Excavator, porter, peddler, stoker and white washer were a few other unskilled occupations found.

Occupation was occasionally problematic to code. Anomalies in the original ship lists or transcription errors in the creation of the MII produced unexpected occupation combinations for husbands and wives. For instance, one woman was listed as a lawyer: Elizabeth Holmes, age 26. She traveled with three family members: Francis Holmes, male age 27; Hannah Holmes, female age 24; and Robert Holmes, male age 28. Francis and Hannah were listed first, both with the occupation of bricklayer. Robert and Elizabeth were listed last, both with the occupation of lawyer. Marital status was not directly reported, but it seems likely that two brothers, Francis and Robert, were traveling together with their spouses. The listed occupations were probably those of the brothers only, and not the wives, so the classification for the women was changed to "unidentified." In other instances, occupation was listed for the wife and left blank for the husband. Where this pattern could be found, the classification for both spouses was adjusted as seemed reasonable.

A final challenge in coding occupation was the sheer variety of occupations listed in the MII. About four hundred occupations listed in the MII could not be directly found in the Armstrong classification system. Examples of unusual (and unclassified) occupations included corkscrew maker, hook shaver, and tamer.

Fortunately, nearly all of the unusual occupations were unique to three or fewer emigrants, so the total impact was to leave fewer than five hundred emigrants with occupations unclassified.

3.4 PEF Records

Little narrative has survived to explain the PEF record-keeping process. However, review of the original records for this research reveals a thorough and methodical system of accounts. Each PEF passage recipient signed a promissory note equivalent to the amount required to cover the cost of passage and freight (if any). When a loan was intended to help a family emigrate, the note was generally signed by the household head and at most one or two other family members. Upon arrival in Salt Lake, the loan was recorded in the general ledger of the PEF, and the loan number was recorded on the note. Remittances and interest charges were recorded in both the general ledger and on the reverse side of the note. Upon repayment in full, the note was either given to the borrower or destroyed. See appendix C for a detailed analysis the completeness of PEF accounting system, including an assessment of care for the records after dissolution of the PEF by the 1887 Edmunds-Tucker Act.

In 1992, the Church Archives department created an alphabetical index to the general ledger. The index lists the name of each borrower, the date of entry into the general ledger, the loan amount, and the volume and folio (or page) on which the loan was recorded. A digital copy of the PEF ledger index was created for this research using optical character recognition (OCR) software. Each page of the index was scanned, and OCR software was used to process the scanned images.

The OCR software recognized the names and numbers in each image and saved them as a spreadsheet table.

The spreadsheets were manually reviewed for errors, page by page. Because OCR chooses its output based on what an image looks like, it was important that the person proofreading the spreadsheet not see the original document. Instead, a second proofreader read aloud from the original page. The two proofreaders were positioned so neither could see the material being viewed by the other. Very few errors were found, other than a common false-recognition of the capital "W" as a capital "V."

The digital PEF index created for this research contains the names of 17,273 borrowers, or approximately 11,000 separate loans, spanning three decades, as shown in figure 3.3.[7] The records are incomplete for loans issued prior to 1854, but external sources indicate that few loans were made in those years (Larson, 1947). Most loans were issued for less than $100, as shown in figure 3.4. A significant minority of loans were for upwards of $400. The largest loans were granted to large households, often extended families traveling together.

The number of loans issued is not the same as the number of borrowers, because some loans list multiple borrowers. Unfortunately, the only way to group borrowers with complete certainty would be to manually review each entry in the general ledger. This research approximates the number of loans by grouping borrowers with the same last name and loan amount, entered on the same date and same folio in the ledger. This approach cannot link groups of borrowers with different surnames, as could happen among extended family groups (e.g. a couple traveling with the wife's parents). On the other hand, some borrowers may be inappropriately

[7]Two names were not included in the linking file because they contained invalid years of emigration.

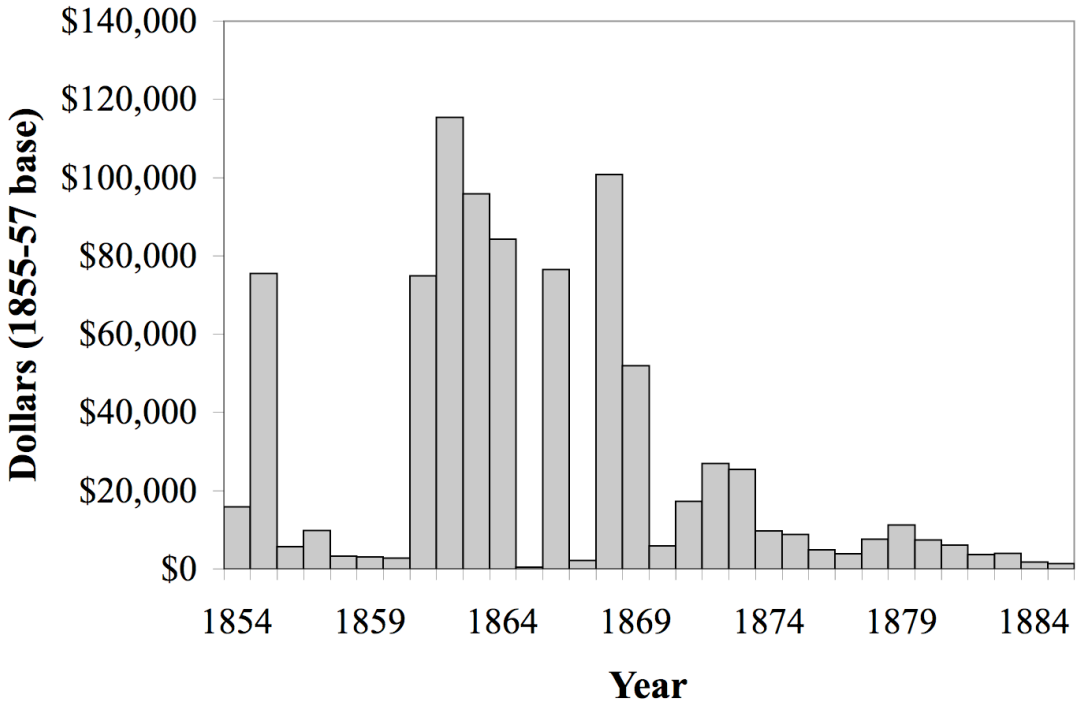


Figure 3.3: PEF Annual Fund Size and Quantity of Loans Made, 1854-1885.

grouped together if they coincidentally borrowed the same amount and shared a common surname. Such false groupings are unlikely because of the wide variation in loan amount and the requirement that the borrowers share not only the same surname but also the same folio and entry date.

3.5 Probabilistic Record Linking

A cross-section of emigrant household heads was created by linking individuals in the MGT transcription, the MII, and the PEF ledger index. To account for variation in nineteenth century orthography, linking allowed for common alternative spellings for names. For instance, "Beasley" could also be spelled "Beazley"

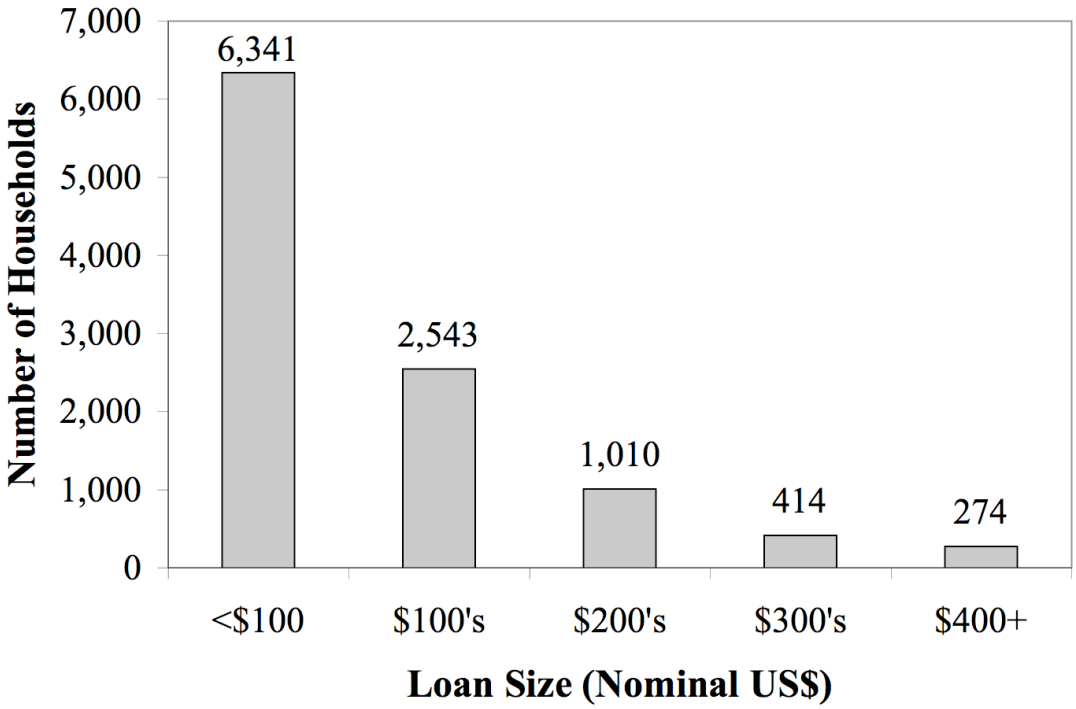


Figure 3.4: Distribution of PEF Loans by Amounts, 1855-80.

or "Beesley." The linking was facilitated by probabilistic record-linking software created for the US Census Bureau by William Winkler.

Probabilistic record-linking is based on the assumption that all three data sources were samples drawn from the same population. For each data source, errors and some incompleteness were introduced in the process of generating records. The Winkler program represents an attempt to specify which variation ought to be attributed to recording error for the same individual and which variation truly indicates the records were made for different people (Winkler, 2001).

Records in the MII and the MGT transcription were linked based on full name and year of birth (within three years). Variation in recorded birth year was common in the nineteenth century, and comparable research often allows for variation of up to five years (Jeremy Atack, 1992). Comparable research typically has several

criteria available for linking, so I selected a more conservative three year window for this project due to the limited available criteria.

Records in the MII and the PEF ledger index were linked based on full name and years of emigration and immigration. The MII recorded the year in which a person sailed to North America, but the PEF ledger recorded the year of arrival in the Salt Lake Valley. The PEF date was allowed to be one or two years later than the MII year of departure to account for any individuals who were delayed along the overland trail.

Fellegi and Sunter (1969) provide a thorough technical explanation of probabilistic record-linking. Jeremy Atack (1992) describes an application of probabilistic record-linking to nineteenth century census records for economic history research. The process can be summarized as four basic steps. First, errors in the way names were recorded were addressed by parsing the full listed name into surname, first name, middle name, and title–a step which Winkler calls standardization. A standard first name was created for records listing a common nickname or abbreviation (such as "Wm." for "William"). A semi-phonetic spelling for each name was created according to the five-character Soundex system.[8]

Next, records in each source were separated into coarse subgroups, called blocks. Blocks were defined by criteria related to name, such as Soundex codes or first and last initials. The purpose of blocking was to increase efficiency by limiting the number of pairwise comparisons to be made between obviously false matches.

Third, records in corresponding blocks from each data set were compared, pairwise. A decision rule was used to classify every possible pair as a definite match,

[8]The Soundex code is commonly used in genealogical research. The first character is the first letter in the name. The rest of the spelling is translated into numeric digits. Long names are truncated, and short names are filled in with zeros.

a definite non-match, or a possible match requiring clerical review. The decision rule allowed for reasonable variation in years and orthography, including common abbreviations, nicknames, and the omission of the middle name. The decision rule also assigned a weight to each possible pair based on how closely the names and years matched and how common (or rare) the name-year combinations were in each data set.

Fourth, the list of possible matches was manually reviewed and reasonable pairs were accepted as matches. The existence of matching weights simplified the manual review, because pairs could be sorted according to how closely they matched. A cutoff weight was manually determined above which all pairs appeared to be reasonable matches. A second cutoff weight was determined below which all pairs appeared to be non-matches. Observations between the two cutoffs were flagged for further clerical review. Observations below the lower cutoff were returned to their original data sets and the process was iterated thrice more with different criteria for blocking and matching.

Criteria for each linking attempt are summarized in table 3.8 for the MII-MGT linkages and table 3.9 for the MII-PEF linkages. Four iterations of probabilistic record-linking yielded 9,959 possible links between the MII and the MGT (3,714 requiring clerical review). A second set of four iterations produced 10,843 likely matches between the MII and the PEF ledger index (3,516 requiring clerical review). Detailed breakdowns of the outcomes of each matching pass are given in tables 3.10 and 3.11. The linkage rate was higher between the MII and the PEF ledger index than between the MII and the MGT transcription.

The difference in linkage rates is most likely a result of differences in the record-keeping processes. Emigration and loan records both involved tracking the expen-

Table 3.8: Criteria for Linking the MII to the MGT Transcription.

Pass	**Blocking Criteria**	**Linking Criteria**
1	(1) Soundex code for surname (2) Soundex code for first name	(1) last name* (2) first name* (3) middle name (4) standardized first name (5) exact birth year*
2	(1) Soundex code for surname (2) initial for first name	(1) last name* (2) first name* (3) Soundex code for first name (4) middle name (5) middle initial (6) exact birth year* (7) approximate decade of birth*
3	(1) first two digits from Soundex code for surname (2) first two digits from Soundex code for first name	(1) last name (2) Soundex code for last name (3) first name (4) Soundex code for first name (5) middle initial (6) middle name (7) approximate two-digit birth year (within exact century)
4	(1) initial for surname (2) initial for first name	(1) last name (2) Soundex code for last name (3) first name (4) Soundex code for first name (5) middle initial (6) Soundex code for middle name (7) approximate two-digit birth year (within exact century)

Note: If a pair had an exact match on all variables with *, then the matching weight for the pair was doubled.

Table 3.9: Criteria for Linking the MII to the PEF Index.

Pass	**Blocking Criteria**	**Linking Criteria**
1	(1) Soundex code for surname (2) Soundex code for first name	(1) last name* (2) first name* (3) middle name (4) standardized first name (5) exact emigration year*
2	(1) Soundex code for surname (2) initial for first name	(1) last name* (2) first name (3) Soundex code for first name (4) middle initial (5) middle name (6) exact emigration year* (7) approximate decade of emigration*
3	(1) first two digits from Soundex code for surname (2) first two digits from Soundex code for first name	(1) last name (2) Soundex code for last name (3) first name (4) Soundex code for first name (5) middle initial (6) middle name (7) approximate one-digit and two-digit emigration year and decade
4	(1) initial for surname (2) initial for first name	(1) last name (2) Soundex code for last name (3) first name (4) Soundex code for first name (5) middle initial (6) middle name (7) emigration year (as a string) (8) approximate one-digit emigration year and decade

Note: If a pair had an exact match on all variables with *, then the matching weight for the pair was doubled.

Table 3.10: MII to MGT Transcription Matches.

Pass	Possible Pairs	Matches	Clerical Pairs
1	146,469	2,221	138
2	289,820	129	126
3	1,294,171	3,380	2,517
4	4,227,746	515	933

Table 3.11: MII to PEF Index Matches.

Pass	Possible Pairs	Matches	Clerical Pairs
1	104,396	6,005	1,944
2	142,996	414	295
3	408,454	464	844
4	2,586,949	444	433

ditures of funds related to travel and were both kept by full-time clerks. In contrast, baptismal records did not involve any financial transactions and were maintained by part-time clerks. Financial transactions generally would have been recorded in more than one location, including on a receipt or promissory note for the individual traveling. Baptism information was occasionally recorded more than once for the same person, however multiple records would have been made at different times, possibly years apart (and possibly by different clerks). The threat of audit was also different for the two types of records. Financial records had to be balanced annually, if not more often. On the other hand, branches were required to report only how many people were baptized each year, but the record books themselves were never subject to review. Finally, the MII and PEF ledger records for an individual would have been made within a few months of each other, whereas many years may have passed between baptism and emigration.

After the probabilistic record-linking was completed, both sets of pairs were combined and all potential pairs and triples were manually reviewed. Probabilistic record-linking was not necessary between the MII-MGT pairs and the MII-PEF

pairs because all pairs could be directly matched using the MII entry. Manual review was necessary, because sometimes two names had enough similarity in spelling to receive a relatively high weight even though they were obviously not a match. A common example was the linking of "Charles" to "Charlotte." If gender had been coded prior to the probabilistic record-linking the Charles-Charlotte combination could have been avoided. Other false combinations would still have required manual review, such as the surname links of Davis to Davies.

3.6 Emigrant Household Head Sample

The final linked sample consists of 2,259 emigrant heads of households from the British Isles, 1854-1885. This represents twelve percent of the heads of household listed in the complete MII. The unit of observation is the individual, with some measures of household composition. To be included in the final sample, each person must be the head of his or her respective household, have an identifiable gender, and be linked to a record of birth year, baptism year and emigration year. Passengers listed in the MII as being returning missionaries or visitors are excluded from the sample. The final sample includes 1,488 men, 987 of whom list an identifiable occupation. Summary statistics for the sample are reported in table 3.12.

By linking baptismal records to the MII, the time lag between baptism and emigration can be observed. This time lag, called "delay" is defined as one for individuals who emigrated the same year they were baptized. Delay is two for emigrants who left the following year, etc. For the final sample, the average delay was 11 years, with a standard deviation of 8.11 years. The average delay is about a month and a half shorter for female heads than for male heads. However, it is

Table 3.12: Household Head Sample: Summary Statistics.

Variable	Male Heads	Female Heads	Full Sample
Age at Baptism (years)	26.1 (11.85)	24.6 (12.45)	25.5 (12.07)
Age at Emigration	35.8 (13.20)	34.2 (14.09)	35.3 (13.53)
Birth or Baptism Year Inferred	17.9%	15.7%	17.2%
Delay (years)	11.08 (8.12)	10.95 (8.10)	11.03 (8.11)
PEF Borrower Rate	28.6%	28.3%	28.5%
Loan Size (among borrowers)	$146.18 (122.71)	$105.99 (87.78)	$132.47 (113.56)
Loan Size (among all)	$40.77 (92.15)	$29.56 (66.36)	$36.94 (84.40)
Female	0	100%	34.1%
Household Size	2.98 (2.32)	1.85 (1.44)	2.59 (2.13)
Number of Workers in Household	2.06 (1.29)	1.35 (0.76)	1.82 (1.18)
Number of Male Workers	1.26 (0.63)	0.15 (0.46)	0.88 (0.78)
Sample Size	1,488	771	2,259

important to note that delay is measured discretely in years, without reference to the months of baptism or emigration. Thus, the small difference in average delay by gender of the head can be considered negligible.

Important characteristics of the final sample are the distributions of years of baptism and emigration. Figure 3.5 charts which years the heads were baptized, with a breakdown by gender. An overwhelming proportion of emigrant heads were baptized between the mid-1840s and mid-1850s. Outside these years, year of baptism is roughly uniformly distributed. Two factors explain the ten-year peak. First, these years correspond with a period of high conversion rates in the British

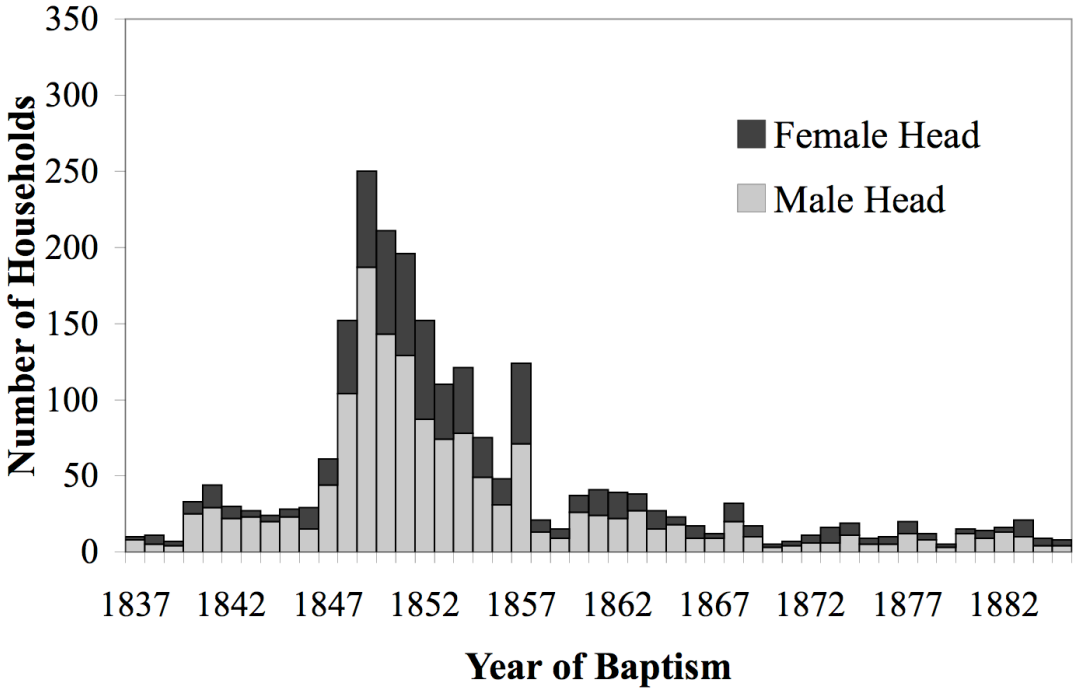


Figure 3.5: Household Head Sample: Year of Baptism, by Gender.

Isles. Second, the electronic transcription of the MGT is more complete for 1857 than for other years.[9]

Distribution of the year of emigration for the final sample is charted in figure 3.6. The sample is front-loaded with half of the emigrants setting sail prior to 1865. The reason for the front-loading is likely due to the large volume of emigrants traveling those years. Of particular note is the lack of emigrants in the sample departing in 1858, the year Johnston's Army marched to Salt Lake. In response to the military threat, Brigham Young ordered a complete halt to emigration for the season.

The listing for origin within the sample, as in the full MII, often held little more detail than "England" or "British Mission." Where a region of origin can be

[9]Refer to appendix A for a complete analysis of the transcription inclusion rate.

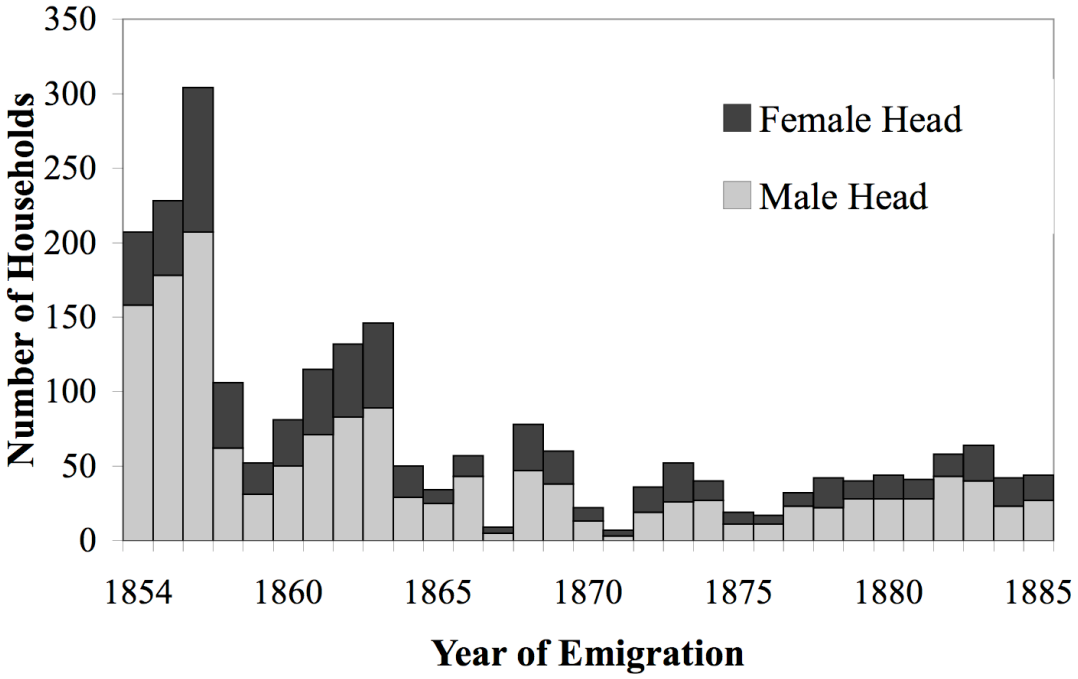


Figure 3.6: Household Head Sample: Year of Emigration, by Gender.

Table 3.13: Household Head Sample: County of Origin.

Region	Male Heads	Female Heads	Total
London &Home Counties	207	93	300
Southwest	73	93	300
South & East	59	19	78
Wales	44	29	73
Midlands	159	68	227
Northeast	18	5	23
Northwest	257	127	384
Ireland	6	3	9
Scotland	44	17	61
Unspecified British Isles	621	372	993
Total	1,488	771	2,259

identified, many emigrants hailed from the Northwest, Midlands, or London and the Home Counties. Only a handful of emigrants were found from Ireland or the Northeast. See table 3.13 for the breakdown of region of origin by gender.

The sample includes a measure of how many family members were traveling with the household head. Table 3.14 reports the size of the household, by gender of the head. Women were more likely than men to travel alone, and this pattern is observed in the complete MII. The final sample has a slightly larger proportion than the complete MII of large households, but the difference is not strongly pronounced. Whereas just under half of the MII households had two or more members, in the final sample 53% of the heads traveled with family. Households consisting of ten or more members are rare in the complete MII and the final sample.

Within the household, the number of potential workers is also observed. Any household member age twelve or older is considered a potential worker. For female-headed households, the average number of workers is 1.35, much lower than the 2.06 average for male-headed households. This is perhaps because of the prevalence of couples emigrating together. If a married couple traveled together, then the household would have a male head and at least two potential workers (the husband and wife). A female-headed household, by definition, would not have included a spouse, but it may have included older children or other female family members.

The disparity between male-headed and female-headed households is particularly pronounced when counting the number of potential workers who were male. Female-headed households had an average of 0.15 male workers, while their male-headed counterparts had an average of 1.26, including the male head. Many women traveled alone or with just one or two family members. It appears that other family members were most likely to be young children or other women. Male-headed households tended to include 0.26 other males age twelve years or older, in addition to the head. It seems reasonable to assume the male workers were often sons or brothers.

Table 3.14: Household Head Sample: Size of Emigrating Household by Gender of Head.

Number in Household	Male Head	Female Head	All Households
1	587	474	1,061
2-4	546	242	788
5-9	341	55	396
10+	14	0	14
Total	1,488	771	2,259

Table 3.15: MII Household Head Sample: Occupation Class, by Gender.

Armstrong Class	Male Head	Female Head
Professional	9	0
Intermediate	67	0
Skilled	589	14
Semi-skilled	67	1
Unskilled	253	3
Unidentified	503	753
Total	1,488	771

The identification of occupation for the household heads was somewhat less successful within the sample than in the complete MII. One third of the men in the sample did not have identifiable occupations (see table 3.15). Among those with an identified occupation, however, the skill level patterns remained relatively unchanged. More than half of the men with an identifiable occupation were classified as skilled. A large minority were unskilled, and only a handful were professionals. Among women, only eighteen listed an occupation.

A critical component of the final sample is the identification of PEF passage recipients. Six hundred forty-four of the household heads were listed as borrowers in the PEF ledger index, but the proportion of borrowers varied year-to-year. Figure 3.7 plots the proportion of the emigrants in the final sample who borrowed from the PEF each year. As predicted by PEF activity, the borrowing rate was highest in the 1860s and lowest in the late 1870s and 1880s. The final sample has

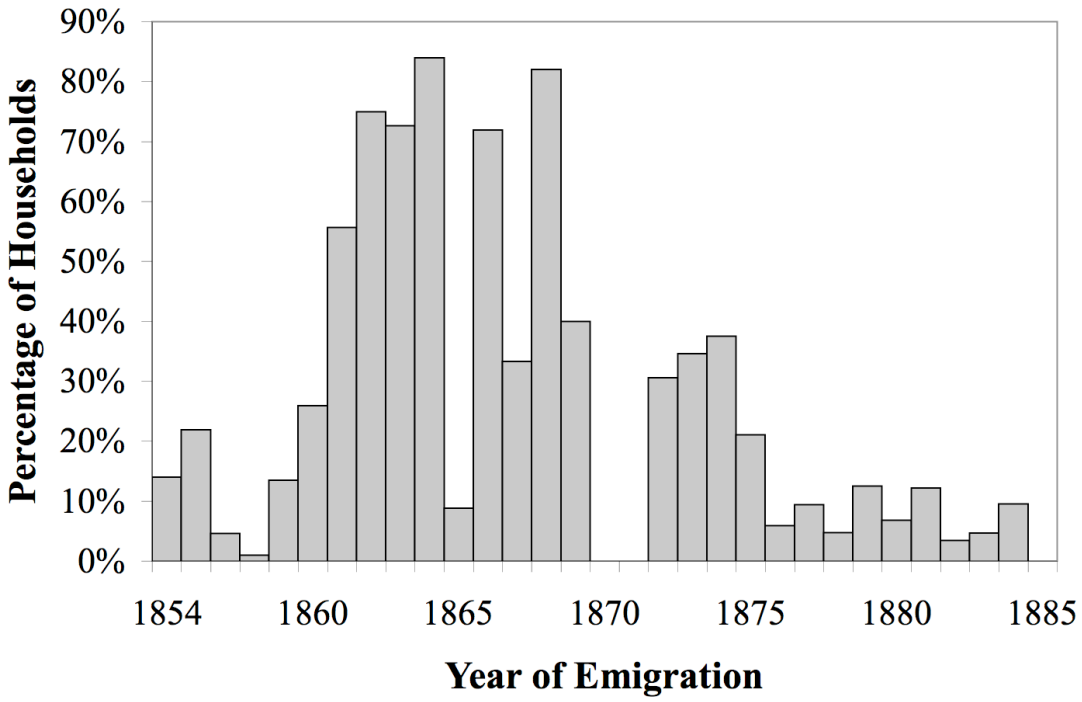


Figure 3.7: Household Head Sample: Proportion of Emigrants Borrowing from the PEF, by Year of Emigration.

zero PEF activity for several years in the sample. The PEF ledger index indicates that several loans were made each of these years, so the lack of borrowers in the final sample is best explained as a sampling phenomenon.

The final sample size is smaller than the sample of Mormon emigrants created by Carson. In particular, Carson's sample was largest in 1868, a year with relatively few observations in this sample. The smaller sample size can be attributed to difficulty in linking emigrants to their baptismal records. The information gained by successfully linking the emigration and baptismal records outweighs the loss in overall sample size. For further comparison, the proportion of emigrants who borrowed from the PEF in this sample is lower than the proportion reported by Carson for 1854-55. On the other hand, the borrowing proportion is much higher in this sample for 1864-65 and 1868. Direct comparison with Carson's sample is

otherwise difficult because he developed his own unique occupation classification system, and he did not code region of origin.

CHAPTER 4

EFFECT OF PEF PASSAGE ON THE TIMING OF EMIGRATION

Existing literature has given little attention to the effect of prepaid passage on the timing of emigration, due mainly to a lack of relevant data. Mormon records, however, allow detailed household-level investigation. Because the PEF played a central role in financing and organizing emigration, the PEF ledger essentially provides a census of the households receiving financial aid to emigrate. Linking emigration records to the ledger index identifies who was or was not able to self-finance emigration. This data source is unique, because existing studies of prepaid passage rely on either administrative records that are not linked to individual emigrants or personal correspondence that can be used only for case studies.

My primary objective is to estimate the effect of prepaid passage, in the form of a PEF loan, on the timing of emigration, separate from the decision of whether or not to emigrate at all. I will also examine other demographic and economic factors that affected timing. Data are limited to a cross-section of emigrants from the British Isles, because baptismal records are more readily available for the British Isles than for other locations.

4.1 Model

The decisions of the PEF agent distributing loans and an emigrant timing the move occurred concurrently, and the outcome of each affected the other. Because

of the simultaneity, the two decisions are modeled as a system of equations.

$$\begin{aligned}\text{delay} &= \alpha_0 + \alpha_1\text{loan} + \sum \gamma_i\text{skill}_i + \alpha_2\text{household-size} + \alpha_3\text{female} \\ &\quad +\alpha_4\text{baptism-age} + \alpha_5\text{baptism-year} + \sum \delta_j\text{region}_j \\ &\quad + \sum \eta_k\text{loan*skill}_k + \alpha_6\text{baptism-age*baptism-year} \\ &\quad +\alpha 7\text{baptism-age}^2 + \alpha_8\text{baptism-year}^2 + \epsilon \qquad (4.1)\end{aligned}$$

$$\begin{aligned}\text{loan} &= \beta_0 + \beta_1\text{delay} + \beta_2\text{delay}^2 + \sum \lambda_i\text{skill}_i + \beta_3\text{household-size} \\ &\quad +\beta_4\text{female} + \beta_5\text{annual-fund} + \sum \theta_k\text{fund*skill}_k + \nu \qquad (4.2)\end{aligned}$$

The unit of observation is an emigrant household. Delay is defined as the time lag between baptism and emigration for the household head. Loan indicates whether the household received a PEF loan of any size. A vector of demographic, economic, and religious characteristics of the emigrant affect both delay and loan receipt, including occupation skill level, household size, and gender of household head. The interaction of skill level and loan receipt allow borrowing to have a differential effect, depending on the occupation of the emigrant. System identification is based on excluding variables. Loan receipt is identified by variation in the annual fund size. The interaction of loan receipt and skill level is identified by the interaction of skill level and fund size. Delay is identified by age at and year of baptism and region of origin for the household head. Each excluded variable is believed to have a direct effect on either loan receipt or delay, but not both. Table 4.1 provides a brief description of each variable in the model.

Table 4.1: Summary of Variables in Each Equation.

Emigrant Decision	**Agent Decision**	**Variable**
x*	x	Delay: Year of emigration after baptism; if both in same year then delay is 1 (agent decision also includes delay-squared).
x	x*	Loan: Indicator of whether emigrant borrowed any PEF funds.
x	x	Skill Level: Pre-emigration occupation classified as unskilled (omitted), semi-skilled, skilled, or highly skilled.
x	x	Household Size: Total number of emigrants traveling together.
x	x	Number of Male Workers: Total number of men age 12+ years in the household.
x	x	Female: Indicator of whether household head was female.
x	–	Age at Baptism of household head.
x	–	Year of Baptism of household head (time trend beginning in 1837).
x	–	Region of Origin: Place of origin in the British Isles classified as London and Home Counties (omitted), North, South, Midlands, Wales, or Scotland.
x	–	Interactions With Loan: Gender or occupational targeting specified as interaction of gender, skilled or semi-skilled occupation with loan.
–	x	Fund: Amount of money available for PEF loans, by year (reported in real $10,000, 1854 base).
–	x	Interactions with Fund: Interaction of annual fund size with gender and skill level (instrument for interactions with loan receipt).
–	–	Vitality (unobservable): Whether health problems forced the delay of emigration.
–	–	Relative Willingness (unobservable): Whether close family members were willing to emigrate.

* Indicates the dependent variable for the equation. Since both decisions were made concurrently the model is best described as a system of simultaneous equations.

4.2 The Emigrant Timing Decision

The primary objective of the model is to test the hypothesis that loan receipt tended to shorten the delay between making the decision to emigrate and making the voyage to America. Because Mormon pioneers selected their destination at the same time that they chose to move, the model will focus on timing, independent of the decisions of whether and where to resettle. Factors affecting the timing of emigration, independent of the choice of destination include demographic, economic, and religious characteristics of the emigrant. Unlike typical models of emigration, the relative economic prospects in the destination and source countries are not needed, because the destination was fixed. Instead, the decision of when to move was dominated by the binding constraint of being able to secure passage to America. In other words, passage was a normal good. Where personal finances were insufficient to purchase passage, PEF funds could sometimes fill the gap.

For most new converts, a liquidity constraint would have been the driving force in delaying emigration. Ideally, the model would control for each emigrant's assets and annual income, however neither are observable for households in my data set. The most reasonable available proxy is the occupation listed for the emigrant on the passenger manifest. As explained in chapter 3, I classify occupation into socioeconomic categories based on the Armstrong system: highly skilled, skilled, semi-skilled, and unskilled (Armstrong, 1972). Armstrong's professional and intermediate classes are combined as "highly skilled" for this model due to the small number of individuals in these categories.[1]

[1]About 300 different occupations are listed for the emigrants in the sample, 60% of which appear only once. Including each occupation as its own binary variable would cost the degrees of freedom needed for estimation.

The classification of occupations assumes that individuals with more highly skilled occupations tended to have more financial resources and would have been able to emigrate more quickly relative to less-skilled coreligionists. In the sample, all women are coded as having an unidentified occupation. In fact, occupation was not recorded for most women. The handful of women in the sample are coded as missing occupation in order to avoid possible perfect classification.[2] In addition to including the occupational categories, the model includes the interaction of skilled and semiskilled occupations with loan receipt. Individuals with skilled or semi-skilled occupations were the most likely to receive a PEF loan through the occupational targeting criteria. Including the interaction terms allows loan receipt to have a differential effect on these borrowers.

There are, of course, some limitations to the use of self-reported occupation. Most potentially damaging is the question of whether emigrants listed the occupation in which they were employed before emigration or the occupation they hoped to practice upon arrival in America. Fortunately, the uncertainty can be somewhat alleviated by reviewing the proportion of emigrants listing occupations in the field of agriculture. The vast majority of Mormon pioneers became farmers upon arrival in the Salt Lake region, but only 4.5% of emigrants listed a farming-related occupation. The proportion of farming related occupations would have been much higher if emigrants were forecasting post-emigration occupations.

Another purpose of this research is to examine the effect of family circumstances on timing. Ferrie (1999) found that emigrants traveling in family groups were more likely to eventually settle in the West. He hypothesized that larger families tended to migrate west because they tended to be wealthier. The available

[2]Women's occupations are set to missing in order to also avoid criticisms about whether Armstrong's classification system is fully appropriate for women's occupations.

data cannot directly address this claim, because there is no measure of household wealth. Instead, the model includes a measure of household size. It is possible that larger families enjoyed not only an increased number of income earners but also economies of scale in living arrangements. If so, larger households may have been able to accumulate savings more quickly than average, thus tending to have shorter delays. On the other hand, families may have been larger because they included grandparents or small children who were net drains on household income and gains to larger families may have been eroded by higher dependency ratios. The number of potential male workers, boys and men age twelve years and older, is included separately in an attempt to tease out the effect of the number of earners from total family size.

The effect of gender on the delay between baptism and emigration follows two main mechanisms. First, female headed households may have faced greater financial challenges, so they would have experienced longer delays. Second, some female headed households were in reality members of male headed households that were emigrating in stages. The husband may have emigrated a season ahead of his wife and children, believing he could more quickly amass the funds to purchase their passage in Utah than in the British Isles. The net effect of gender on timing is, therefore, ambiguous. The interaction of loan receipt and gender is also included to allow for PEF funding to have a differential effect on women and men.

The timing of emigration was likely affected by the age of the individual when the decision to emigrate was made. By the end of the century, the typical immigrant to America was between the ages of 15 and 35. The standard explanation given is that differences in the opportunity costs and expected returns to emigration were favorable for the young versus the middle-aged and elderly (Hatton and

Williamson, 1998). It may have been more difficult for older adults to decide to be baptized, because they were reluctant to emigrate. Whether or not older individuals took longer to decide to convert and be baptized, once the decision to emigrate was made older individuals may have been better prepared to emigrate more quickly, on average, than their younger peers. This would be particularly true to the extent that age was correlated with wealth. In this model it will be possible to look at the effect of age on the timing of emigration, separate from the decision of whether to emigrate, by including age at baptism.

Year of baptism and the region of origin for the household head are included in the emigrant's timing equation to control for idiosyncratic differences in attitudes across time and geographic space. The baptism year trend has a base of 1 for those baptized in 1837, the first year Mormon missionaries traveled to England. Origin was listed for each emigrant on the passenger manifest. The British Isles are divided into several regions, based on the predominant industries, cultures, and geography. Within the sample, there are sufficient observations to establish seven regions: London and Home Counties, South (consisting of southwest and southeast), Midlands, Wales, North, and Scotland.[3] Individuals listing their occupation more broadly are categorized as "general British Isles." If there were systematic differences in the "quality of conversion" or zealousness with which emigration was preached, then the differences will be captured by year and regional variables.

Two important variables missing from the model are the vitality of the emigrant and the willingness of other family members to emigrate. The voyage across the ocean was physically taxing. Illness, disability, or pregnancy of a household

[3]The regions used in this estimation are consistent with those reported in chapter 3 with three exceptions: South is made of both the Southwest and Southeast regions; North is made of both the Northwest and Northeast; individuals from Ireland are eliminated due to insufficient representation.

member could have postponed the departure of the entire household, although records of births (and deaths) aboard the vessels suggest health concerns did not always dissuade families from taking the steps to emigrate. Unobservable household bargaining must surely have gone on within the families, particularly when not all members of the household were baptized at the same time, if at all. A possible control for willingness to emigrate could be the year of baptism for other household members. Unfortunately, the scarcity of baptismal records makes it difficult to locate baptismal records for family members not baptized at the same time. It would be impossible to determine whether a missing record was due to an inconsistency in the record books or to emigration of a non-baptized individual.

Despite limitations in which variables are observable, the model of emigrant timing is reasonably complete. A household emigrated as soon as sufficient funds were amassed or as soon as a PEF loan became available. Differences are allowed due to gender, age, and household size. Furthermore, the model controls for the possibility of a time trend and/or variation associated with geographical region of origin. The main questions to test are whether loan receipt tended to shorten delay and whether delay decreased with emigrant age, occupation skill level, or household size.

4.3 The Loan Allocation Decision

At the same time that would-be emigrants were working to secure passage, the PEF agent was deciding which emigrants would be offered loans. The articles of incorporation and publications in the Millennial Star instructed the PEF agent to prioritize helping the "worthy poor," with secondary emphasis on aiding "mechan-

ics, potters, and artisans" who could help in building the Salt Lake settlements. No other constraints were placed on the agent except the total amount to be distributed each year. The duality of funding goals, in the presence of an overall budget constraint, suggests the agent had to balance poverty alleviation with occupational targeting in the disbursement of loans.

"Worthy" need of potential borrowers referred to both the diligence with which the would-be emigrant worked to save money and the commitment of the emigrant to the church. Worthiness was measured in large part by how long the person had been a member of the church. An individual who joined the church for the sole purpose of securing passage to America would be unlikely to maintain the commitment for many years. By requiring delay to be sufficiently long, the PEF agent could eliminate much of the moral hazard present in the model. Unobservable indicators of devotion (and need) may have included recommendations from church leaders or persuasive pleadings of the individual seeking a loan.

Consideration by the PEF agent of how long a potential borrower had been a member introduces endogeneity into the model. If the main hypothesis–the effect of loan receipt on timing–were estimated as a reduced form model, then the coefficient on loan receipt would be affected by selection bias. To the extent that loan receipt increased with delay, the coefficient on loan receipt in the reduced form equation would be biased downward. The simultaneous equations model controls for the endogeneity and selection bias, as long as the system is identified. Previous research on the PEF did not include the year of baptism, so this model represents a first attempt to test whether the likelihood of loan receipt was proportional to how long the person had been a member. Both delay and delay-squared are included in the model to allow for the effect to be quadratic or linear.

Potential occupational targeting is included in the model through the use of Armstrong-type classifications of pre-emigration occupation. The PEF did not publish a list of which occupations were to be favored beyond the three-word description, "mechanics, potters, and artisans." It seems reasonable that occupations needed in Salt Lake would generally have been classified in the skilled category. Professionals, such as lawyers, would not have been in such great need on the frontier as farriers or stone carvers. Carson (1998) found no evidence of occupational targeting in which emigrants received loans. He argued that artisans and mechanics rarely needed the financial boost of a loan in order to emigrate, so PEF agents were able to focus on helping poor converts. The current model, then, represents a second attempt to examine the relationship between occupation and loan receipt.

In addition to direct occupational targeting, PEF agents may have favored households consisting of many able-bodied men who could work hard on the Utah frontier. Work by Carson suggested household size may have affected loan receipt, with loans being more likely for larger households in the late 1860s. To account for this sort of favoritism from the PEF agents, total household size and the number of men and boys in the household age twelve years or older are both included.

The anticipated affect of gender on PEF passage receipt is ambiguous. A woman may have been more likely to receive passage since single mothers and widows are generally perceived as vulnerable members of society. Additionally, a husband emigrating in advance of his family might secure passage for his wife and children through the PEF fund. Regardless of whether a husband had borrowed the funds to prepay passage, the woman would appear in the PEF ledger. A confounding effect, however, would be introduced if the husband sent money through

a different channel, making the wife better off than the average emigrant and less likely to receive a loan.

A final variable affecting loan allocation was the amount of money available in a given emigration season. The annual fund varied dramatically year to year, depending on fund-raising success and on remittance rates of previous borrowers. Fully understanding the reasons for the variation in the fund size is beyond the scope of the current research other than to say that the changes were exogenous to the system at hand. The dramatic variation would have made it hard for the PEF agents to predict future availability of funds, let alone prediction by the emigrants themselves. As the fund size increased, the threshold for establishing financial need would have dropped. The model can test the hypothesis that, all else held equal, the larger the annual fund, the more likely an emigrant was to get a loan.

4.4 Identification of the Model

Identification of the model is based on reasonable exclusions from each equation. The equations for delay and loan receipt include many of the same variables, because both were affected by a combination of personal circumstances. However, each endogenous variable is identified by one or more exogenous excluded variables.

In the emigrant delay equation, loan receipt and the interaction of loan receipt with gender and skill level are endogenous to the system. Loan receipt is instrumented by the annual fund size. PEF fund size is thought to have a dramatic effect on loan receipt, but the annual fund would not have directly entered into an emigrant's budget constraint. Fund size would have had only an indirect effect on emigrant timing through the allocation of a loan. The loan receipt interaction

terms are instrumented by interacting fund size with gender and the corresponding skill levels.

In the PEF agent equation, the endogenous variables are delay and the square of delay. Three variables are used as instruments for delay because they affect the timing of emigration but not loan receipt: region of origin, age at baptism, and year of baptism. There is no published evidence to suggest regional targeting in the provision of PEF loans. Likewise, there is no evidence of preferential treatment for an emigrant based on age at or the era of baptism. The square of delay is instrumented using the squares and cross-products of the instruments for delay: baptism age-squared, baptism year-squared, and the product of baptism age and baptism year.

4.5 Results

The system of simultaneous equations is estimated using three stage least squares (3SLS). The 3SLS estimator combines an instrumental variables (IV) approach with a generalized least squares (GLS) approach and allows for correlation in the disturbances between equations. The 3SLS corrects for the endogeneity between loan receipt and delay. The estimator is both consistent and asymptotically efficient as long as disturbances are normally distributed. Even without normality, the 3SLS estimator is asymptotically efficient among all IV estimators using only the sample information embodied in the system (Greene, 2000). None of the IV's in the model are drawn from outside the system. For instance, the instrument for loan receipt is the annual fund size for the PEF, a logical predictor of loan receipt regardless of its roll as an instrument.

Estimates for the full model are presented in table 4.2. The model includes all 2,250 emigrants with the special coding for occupation of all women set to missing. The base category for the estimation is a self-financing male from London with an unskilled occupation.

Table 4.2: 3SLS Regression Results.

	Emigrant Timing Decision	**PEF Allocation Decision**
Loan Receipt	-5.793*** (1.069)	–
Delay	–	0.037*** (0.010)
Delay Squared	–	-0.001*** (0.000)
Fund	–	0.053*** (0.004)
Highly Skilled	-1.585* (0.851)	-0.014 (0.052)
Skilled	-5.227*** (0.696)	-0.034 (0.041)
Semiskilled	-5.721*** (1.392)	-0.059 (0.078)
Missing Occupation	6.871*** (0.527)	0.073** (0.034)
Household Size	0.494*** (0.086)	0.029*** (0.005)
Number of Male Workers	0.305 (0.292)	-0.017 (0.018)
Female	-4.428*** (0.583)	-0.047 (0.034)
Baptism Age	-0.159*** (0.047)	–
Baptism Year	-0.801*** (0.060)	–
Unspecified UK	-1.653*** (0.450)	–

continued on next page...

Table 4.2: (Continued)

	Emigrant Timing Decision	**PEF Allocation Decision**
Wales	0.588 (0.792)	–
Midlands	0.892* (0.532)	–
North	0.022 (0.465)	–
South	-1.683** (0.569)	–
Scotland	1.291 (0.848)	–
Loan×Skilled	11.637*** (1.497)	–
Loan×Semiskilled	10.315** (3.549)	–
Loan×Female	2.083 (1.372)	–
Fund×Skilled	–	0.006 (0.006)
Fund×Semiskilled	–	0.007 (0.013)
Fund×Female	–	0.001 (0.005)
Baptism Age Squared	0.001 (0.001)	–
Baptism Year Squared	0.007*** (0.001)	–
Baptism Age×Year	0.000 (0.001)	–
Constant	25.022*** (1.140)	-0.142** (0.052)
Sample Size	2,250	2,250
R-squared	0.374	0.245

Standard errors in parentheses
* Indicates 1% significance
** Indicates 5% significance
*** Indicates 10% significance

The emigrant decision of when to emigrate is well-explained by several individual and household characteristics. Loan receipt, skill level, gender, and the interaction terms for skill level and loan receipt are statistically significant and are discussed in detail later. Emigrants with larger families tended to delay a little longer than emigrants with smaller families, but the number of male workers in the household had no discernable effect. Age at baptism and year of baptism both had statistically significant effects on delay. For every year older a convert was at the time of baptism, delay was shortened by almost two months on average, and converts who entered the Church in later years tended to have shorter delays than converts who joined early on. The region indicators are jointly significant at the 1% level. The regional results seem to be driven by the negative coefficient for the south (outside the of London and the Home Counties) and the positive coefficient for the Midlands. The southern region is the most rural area in the sample, so the effect may indicate a greater enthusiasm for emigration among rural populations, as opposed to urban populations. However, I have no consistent explanation for the Midlands effect.

Estimation of the PEF agent decision equation indicates that the likelihood of allocating a loan to an emigrant household was affected by three factors: the amount of money in the annual fund, the size of the emigrant household, and how long the emigrant household had been waiting since baptism. All three effects are estimated with precision and are statistically significant at the 1% level. If more money was available in a particular year, then the agent was more likely to allocate the loan. Large households were generally more likely to be given loans, though the number of men and older boys in the household had no discernable effect. A longer delay since baptism also tended to increase the likelihood of loan receipt, to a point. While the coefficient on delay is positive, the coefficient on the quadratic

term for delay is negative. The quadratic relationship peaked at the thirteenth year since baptism. The net effect of delay became negative for emigrants waiting more than twenty-five years post-baptism.[4] Gender had no discernable effect on loan allocation. The coefficients on occupation skill levels are all imprecisely estimated except for the missing occupation category.

Additional estimation was completed in order to determine whether the results were sensitive to the inclusion of women or of men with unidentified occupations. For the most part, the results remain qualitatively unchanged (see table 4.3). One surprising difference is that estimation using only men with identified occupations, yields a positive coefficient for the main effect of loan receipt. When the sample is limited to men with identified occupations, the effect of borrowing is to lengthen delay–even for unskilled men. Otherwise, the results were unchanged in both sign, approximate magnitude, and statistical significance.

Carson (1998) suggests a partial explanation for the surprising change in the loan effect coefficient. Carson hypothesized that the PEF evolved through the decades in terms of who received loans. He claimed that the fund was initially quite generous and somewhat undiscriminating in the allocation of loans. As fund managers learned more about the remittance habits of borrowers, loan allocation became more judicious, with a larger emphasis on long-term Church membership. At the same time, emigration record-keeping also changed. In the 1870s and 1880s, few men listed their occupations at emigration, while occupation was listed for almost all men emigrating in earlier years.[5] The possibility that institutional changes in the PEF coincided with changes in the propensity to record occupation

[4]In the sample, 70% of observations delayed one to thirteen years. Only 167 (7%) had delays longer than 25 years.

[5]When estimation was replicated for different years of emigration, the main effect of loan receipt was positive for emigration after 1870 and negative elsewhere.

does not explain why the coefficient on loan receipt changed signs, but it suggests a line of inquiry to pursue for future research.

Table 4.3: 3SLS Sensitivity Tests.

Net Effect on Delay (change in years)	**Full Sample**	**All Men**	**Men with Occupation**	**All Women**
Unskilled, PEF borrower	-5.79	-7.43	2.20	–
Skilled, Self-financed	-5.23	-5.71	-2.38	–
Skilled, PEF borrower	0.62	-0.13	3.10	–
No Occupation, Self-financed	6.87	7.82	–	–
Additional household member	0.49	0.36	0.08	0.97
One year older at baptism	-0.16	-0.15	-0.08	-0.14
Baptized one year later	-0.80	-0.83	-1.28	-0.82
Female, Self-financed	2.44	–	–	–
Female, PEF borrower	-1.27	–	–	-1.39
Net Effect on Loan Allocation (change in probability)	**Full Sample**	**All Men**	**Men with Occupation**	**All Women**
Additional household member	0.03	0.02	0.03	0.04
Additional $10,000 in PEF fund	0.05	0.05	0.05	0.06
Peak effect for Delay (years)	13	14	10	11
Sample size	2,250	1,482	980	768

* Reported numbers are the coefficients compared to the based category (an unskilled, self-financed male household head).

4.6 Discussion

The estimation yields interesting results for both the emigrant timing decision and the PEF agent allocation priorities. Beyond discussion of the statistical properties of the point-estimates, interpretation of the regression coefficients must account for the inclusion of nonlinear regressors. Nonlinearity makes estimation sensitive to seemingly innocuous changes in the regressors, such as changing the scale of a variable or changing the reference category in a series of indicator variables. In a completely linear model, such changes have straightforward effects on the point estimates, but not so when interaction terms are included. For this model, proper interpretation of the effect of a characteristic on delay will often require a discussion of the sum of multiple coefficients. Even with the nonlinearity, the net effect of a characteristic or combination of characteristics will not change, regardless of changes in the point estimates of particular coefficients.

4.6.1 Effect of Loan Receipt on Delay

The main finding of the analysis is that loan receipt had a differential effect on delay, depending on the emigrant's gender and occupation. Unskilled male-headed households tended to gain the most from borrowing. For these households, the net effect of borrowing was to decrease delay by 5.8 years. Female-headed households also gained from borrowing. The effect of female borrowing is the sum of the main loan effect (-5.8) with the effect of the interaction of gender and loan receipt (2.1). The marginal effect of the borrowing for a female-headed household was to decrease delay by 3.7 years. For men with skilled or semiskilled occupations the impact of loan receipt was markedly different.

Skilled emigrants were the most likely to have occupations targeted by PEF agents. The net effect of borrowing for a skilled emigrant is the sum of the direct effects of loan receipt plus the effect associated with the interaction of skill and loan receipt. The direct effect of being skilled, rather than unskilled, was to shorten delay by about five years. Surprisingly, the coefficient on the interaction of skill level and loan receipt is 11.6, so the net effect of borrowing by a skilled emigrant was to *lengthen* delay by almost six years, as compared to self-financing. The skill level premium and the borrowing penalty cancel each other out, so borrowing from the PEF completely eroded the advantage of having a skilled occupation, relative to a self-financed emigrant who was unskilled.[6]

The net effect of borrowing for someone with a semiskilled occupation is also the sum of coefficients. Being semiskilled rather than unskilled tended to hasten delay by 5.7 years, but again the interaction term with borrowing is large and positive. As with skilled emigrants, the marginal impact of borrowing for the semiskilled group was to increase delay by 4.5 years. When compared with an unskilled contemporary, the penalty for borrowing again washes out the benefit of having a semiskilled occupation, so the net effect is shorten delay by only 14 months compared to how long a self-financing unskilled worker would wait.[7]

The positive impact of loan receipt on delay for skilled men suggests that PEF loans were catching the slowest-moving of the skilled emigrants. It is difficult to construct a mechanism whereby loan receipt could forcibly lengthen delay, since a borrower always had the option to emigrate sooner with self-financing. A more reasonable approach is to examine what characteristics skilled borrowers might have shared that would be associated with being slower to emigrate.

[6]Net effect (0.62) = Loan effect (-5.79) + Skilled effect (-5.23) + Interaction term (11.64).
[7]Net effect (-1.20) = Loan effect (-5.79) + Semiskilled effect (-5.72) + Interaction term (10.32).

One explanation is that a PEF loan, while helpful, may have been insufficient to fully compensate for the unmeasurable disadvantages experienced by borrowers. Unobservable, exogenous circumstances could have increased the cost of emigrating or lowered income for some households. Straightforward examples include caring for aging parents, debt, major illness, and the injury or disability of a household member. Families who were the sole means of support for aging parents may have been unwilling to abandon their parents in order to emigrate. Such converts may have extended their stay in the British Isles by several years, if not decades. A PEF agent may have considered the financial drain of such care sufficient qualification for a loan, and these individuals would have emigrated with PEF assistance after they fulfilled their familial duties.

Would-be emigrants may also have been slowed in their departure due to debt or an illness or injury within the immediate family. Even a temporary disability could have decreased the household's income and increased their expenses. This would have made it more difficult for the group to finance emigration, and thus lead to qualification for PEF assistance. Beyond the financial impact of the illness or injury, the household may have been prevented from traveling until the family member healed.

Another explanation for the increase in delay due to borrowing is that some skilled converts may have needed inducement to overcome expected wage losses. While certain skills would be as well- or better-paid in Utah than in the UK, other skills may be valued less on the frontier than in the UK. Two contrasting examples might be carpentry and fishing. A carpenter could be confident that his skills would be needed in Utah to keep up with growth and construction demanded by other immigrants. On the other hand, a fisherman along the British coast could

not reasonably expect his ocean-fishing techniques to be as highly valued in land-locked Utah. Such emigrants may have been "on the fence."

The hypothesis that PEF loans were systematically offered to skilled household heads who needed an inducement to emigrate is supported by the presence of substitute forms of financial assistance. Many financial aid and cost-cutting experiments were developed with the goal of making "gathering" accessible to all converts (Jensen). The most famous of the cost-cutting experiments includes the use of low-cost handcarts as substitutes for wagons. If other available opportunities were adequately meeting the needs of enthusiastic emigrants, then a PEF loan may have been the form of aid reserved primarily for skilled emigrants who were "taking too long" to self-finance passage. Private aid eclipsed PEF lending from 1881 onward, so the hypothesis could be particularly true in the final decade of the PEF.

4.6.2 Effect of Gender

For female household heads, PEF loan receipt tended to decrease delay by about 3.7 years, as compared to a self-financing woman.[8] When comparing women to men, the effect of gender and of loan receipt are both sums of multiple coefficients. The coefficient on being female is -4.43, suggesting that women emigrated more quickly than men. This difference holds true as long as all other observable characteristics are identical. If any other characteristics vary, such as skill level, then this is not the true difference. In the sample, all of the women are coded as missing occupation, so any comparison between a woman (without an occupation) and a man with an occupation must consider the coefficient for skill level.

[8]Net effect (3.7) = Direct loan effect (-5.79) + Interaction of loan receipt and gender (2.08).

When comparing women to unskilled men (the base category), women tended to be delayed 2.44 years longer on average.[9] This result is compatible with the theory that female-headed households were financially worse off than male-headed households. It is also compatible with the hypothesis that female-headed households consisted primarily of women who were following their husbands in a staged migration of the family. The data do not link households members who traveled in different voyages, let alone those traveling in different years. This sort of within-household chain emigration could effect the average delay of both the men and the women. It is possible that families were able to finance emigration of the father-husbands relatively quickly. Emigration of the rest of the family members, led by the matriarch would have occurred in a later season. Thus, the average delay for men is decreased while the average delay for women may be increased.[10]

It is interesting to note that gender appears to have no discernable effect on the allocation of PEF loans. The point-estimate for the effect of gender in the PEF agent equation is negative but imprecisely estimated. The effect of missing occupation must again be combined to compare women with unskilled men, and this effect is positive but also imprecisely estimated. The lack of obvious favoritism towards women is compatible with the intra-family chain migration hypothesis. If women were emigrating more slowly because they were financially worse off, then it is surprising that the PEF agent did not systematically offer them funding. On the other hand, if the women were following their husbands, then their husbands were presumably helping them financially.

Financial assistance from a husband in Utah may or may not have been sent through the channels of the PEF. The PEF ledger indicates that some emigrants

[9]Net effect (2.44) = Gender effect (-4.43) + Missing occupation effect (6.87).

[10]I have received funding from the Charles Redd Center for Western Studies to pursue research on the role of within-family timing of emigration for the female-headed households in this sample.

were "sent for" by a relative in Utah.[11] However, widespread use of the PEF to send money home would tend to create a positive coefficient for gender in the loan allocation decision. The absence of a significant impact of gender on loan receipt calls into question whether the husbands in Utah found other ways to help their wives. Money may have been sent through other channels, or the men may have found ways to cut emigration costs. One way a man could have cut the cost of travel for his family was to gather provisions in Utah and send them to the family at the start of the overland wagon trail to Utah. Then, the family would only need enough money to pay for part of their passage. The expansion of railroad travel all the way to Utah would have made such assistance less important.

4.6.3 Effect of Skill Level

This analysis confirms that income affected the timing of emigration, even among emigrants with a religious motive. Converts were able to emigrate more quickly if they held an occupation that required some specialized skill. The impact of having a higher level of skill is not linear, however. The premium for having a professional or intermediate occupation is smaller than for being skilled or semiskilled, relative to an unskilled occupation, even though the income was presumably higher for the highly skilled professionals. The nonlinearity may be explained by the importance of having "the right" skills. Skilled (and semiskilled) craftsmen often had abilities which were in high demand in Utah, whereas professional skills would be less needed on the frontier.

[11] I do not incorporate the distinction of being sent for into the data because too little is known about the record-keeping practice.

Additionally, craft skills were more transportable than professional skills. A blacksmith needed only to bring his tools, and he could set up a practice upon arrival in Utah. Professional occupations may have relied more heavily on networks. The close network ties were severed at emigration, and the professional faced the daunting challenge of creating new ties in Utah. The difference in the transportability of skills would have played into the short-term timing of when to make the move to Utah. Increased dependence on location may have induced professionals to postpone emigration by a few years, relative to their skilled counterparts, while still moving sooner than their poorer, unskilled coreligionists.

In terms of how PEF loans were allocated, there is no evidence of occupational targeting. An explicit goal of the PEF was to speed the emigration of converts with skills needed in Salt Lake. If PEF agents commonly aided skilled craftsmen, then the coefficient on skill level should have been positive and significant. To the contrary, the coefficient is imprecisely estimated and negative. The positive coefficient for the missing occupation category is likely an artifact of changes in the emigration record-keeping in later decades. Furthermore, a test of the joint significance of the three non-missing occupational variables could not reject the null hypothesis of zero effect in the PEF agent decision equation.[12] This suggests that PEF agents focused aid on converts demonstrating financial need. These results corroborate earlier work by Carson.

[12]A test of the joint significance of all four skill variables, including the missing occupation category, is rejected at the 5% level, but the result seems driven exclusively by the missing occupation category coefficient.

4.6.4 Effect of Age and Household Size

Other goals of this analysis were to determine whether age or household size affected the timing of emigration. The age of the household head was measured at baptism, because baptism indicated the point of commitment to emigrate. As expected, converts who were older at baptism were able to emigrate more quickly than younger converts, by about two months for every year of age. The findings are consistent with research by Ferrie (1999). Older emigrants may have been less common than younger emigrants, because they had somewhat less to gain financially from emigration. However, the characteristics that would have made emigration less inviting for older individuals may have also made them better prepared to emigrate once the decision to leave was made.

The effect of household size did not confirm the initial hypothesis. Instead, larger families were observed to have longer delays. A family was delayed an additional half a year longer than an otherwise similar family for each additional member of the household. The result suggests that any gains from economies of scale experienced by the households were counterbalanced by increased dependency ratios.

4.6.5 Effect of Baptism Year

An interesting finding is that year of baptism had an impact on emigrant timing. Converts who joined the Church in later decades were able to emigrate more quickly than the early converts. While surprising at first, additional reflection suggests several possible reasons for the result. Many of the uncertainties associated with emigration were diminished in later years. As more converts made the move, advice

regarding how to pack and what to expect upon arrival would have become more accurate and more readily available. It also could have been easier to move because the emigrants would have been more likely to know someone who was already in Utah and who could help them settle in. In addition, the conditions in Utah would have been more hospitable in later years because of advances in infrastructure.

From a pragmatic point of view, the mechanism for organizing emigration would have improved through the years. At the very least, the institutional knowledge about securing passage would have been greater as more tickets were purchased. Emigration agents developed ongoing relationships with certain captains, as evidenced by multiple voyages on the same ship. The ability to secure reliable passage would have allowed emigration in greater numbers in later years. Also, and perhaps most importantly, the cost of emigrating as a share of annual income for manual workers was almost certainly declining throughout this time period.

4.6.6 PEF Lending Priorities

The published priority of the PEF was to facilitate emigration of the "worthy poor," with a secondary goal of speeding emigration of converts with particular skills. The results indicated that PEF agents measured need in terms of how long the household had been waiting to emigrate (delay) and family size. There is no evidence of any systematic consideration of occupation by the PEF agents, as discussed previously.

The effect of increased delay was to increase the likelihood of loan receipt. The result is consistent with published recommendations that "worthiness" be demonstrated through ongoing participation in and dedication to the Church. Carson

(2002) explained the tenure requirement as a mechanism for diminishing moral hazard among phoney-converts who were baptized with the sole purpose of receiving emigration aid. Deference to tenure in the Church also served as a rationing device, where priority was given to people who had been waiting the longest.

PEF agents apparently recognized the financial need of large families, because families were more likely to receive loans if the household size was large. This is consistent with the earlier result that larger households tended to have longer delays. One potential criticism of this interpretation is that PEF agents may have considered the composition of the households, not just the size. Agents may have funded larger households, because they wanted to recruit more workers for the Utah frontier. Work in the frontier required heavy manual labor, and much of the work was probably better-suited to the male physique. If the PEF agents were looking for workers, then they would have been more interested in men than in women. They may have also been interested in the number of older boys in the family who could grow into the work.

The number of boys and men, age twelve years and older, was measured separately from household size. By including both measures, the impact of household composition can be examined separately. Whereas total size tended to increase loan receipt, the number of male workers did not. The estimated coefficient is negative but imprecisely measured. The conclusion is that agents were not targeting potential laborers in the provision of PEF loans. Rather, they were focused on aiding those in need.

The provision of prepaid passage through the PEF was bounded by the physical constraint of the annual fund. Agents could not distribute more money than was available in their budget. As the annual fund increased, agents could distribute

more money. This is reflected in the positive coefficient on fund size, significant at the 1% level.

The findings have implications for prepaid passage in settings outside of the PEF. Just as delay increased the likelihood of receiving PEF passage, it seems reasonable that family members would assist their relatives who were the earliest to express interest in emigrating. Unfortunately, there is no other known source for data on that issue. Another logical question is whether bigger families were more likely to be offered prepaid passage among populations other than Mormon emigrants. Review of Scandinavian emigration records may shed light on this question. According to Hvidt (1975), emigration records from Denmark recorded where the tickets were purchased. If the purchase information was recorded with the manuscript passenger lists, then the relationship between household size and prepaid passage could be examined.

CHAPTER 5

DETERMINANTS OF PEF LOAN SIZE

5.1 Introduction

Many PEF passage recipients exercised the option to self-pay a portion of the transportation costs, while others borrowed the full amount. In addition to providing loans to emigrants, the PEF accepted donations from emigrants of means. Donations were accepted from converts around the world–not just from Church members already in Utah. PEF participation, then, ranged from borrowing the full price of passage, to borrowing a portion of the cost of passage, to making a donation to the fund. The total amount borrowed by passage recipients varied from less than five dollars to several hundred dollars, depending on need and household size.

This research explores the extent to which personal and household characteristics influenced the size of the PEF loan. It extends research by Carson (1998, 2000) in which the determinants of loan receipt are examined using a binary measure of receipt. My primary objective is to determine whether occupation and tenure in the Church affected loan size. I am also interested in the effects of other demographic and household characteristics on loan amount. Understanding the characteristics associated with higher loans will better facilitate comparison of the PEF with other forms of lending. Data are again drawn from the sample of heads of emigrant households that I created from emigration, lending, and baptism records.

5.2 Latent Variable Model for Loan Amount

Loan amount and PEF participation present a classic censored latent variable model. The latent variable, PEF participation, would be measured in terms of £s borrowed or donated at the time of emigration. Donations would be considered negative loans, and those not participating would be recorded as zeros.[1] Unfortunately, records of donations to the fund are virtually nonexistent.[2] For those borrowing from the fund, PEF participation is identical to loan amount as recorded in the general ledger. For all others, loan amount is truncated at zero. It is impossible to distinguish between self-financing emigrants who made donations and those who did not make donations.

The actual process by which PEF loans were distributed in the British Isles is unknown. The PEF charter and official Church publications indicate the sister goals of the PEF were to aid the "worthy poor" and to hasten the emigration of skilled craftsmen who could help build up the frontier community. Beyond the stated goals, little is known about how distributional decisions were made. I follow the convention established by Carson (1998) and assume allocation decisions were made solely by the PEF agent. Reasonable conjecture suggests that the PEF agent may have been swayed by letters from congregational leaders, but there is insufficient evidence to conclude that allocation decisions were actually made by congregational leaders.

The general ledger records loan amount for the entire emigrating household. Household sizes in the sample vary from single individuals to groups as large as

[1]The terminology "negative loan" for a donation should not be misconstrued to suggest the PEF paid interest to investors. Donors to the PEF were well aware that their donations were outright gifts.

[2]Donor lists record the name and residence of the donors along with amounts. To date, I have found lists for donations made in Utah only.

eleven, and this variation must be taken into consideration in the model. For this analysis, I calculate the amount borrowed per person. The amount is measured in real U.S. dollars with a base year of 1854, the first year in the sample.[3] Loans are measured in dollars rather than £s, because dollars are the currency recorded in the general ledger.[4] It is not clear where (or when) the exchange rate was calculated by PEF officials, but it seems unreasonable that emigrants and agents could have used anything but published, current rates.[5]

5.3 Factors Expected to Effect Loan Amount

The loan allocation decision process of the PEF agent is discussed in detail in chapter 4. Occupation, household size, and gender are expected to potentially affect the amount loaned to (or donated by) a household. These factors, along with marital status, have been modeled by Carson (1998) using a binary measure of loan receipt. Carson found limited evidence that artisans were somewhat less likely to receive loans than individuals with other occupations. He hypothesized that PEF agents focused on lending to poor individuals and those with long-time affiliations with the Church (Carson 1998: 64-65). Carson was unable to directly test his hypothesis, however, because he did not have a measure of tenure in the Church. This research extends the work of Carson by controlling for how long a potential borrower had been a member before emigrating.

[3]Real values are based on the U.S. Consumer Price Index developed by Officer (2007).

[4]Promissory notes corresponding to the general ledger entries were also recorded in dollars, and the notes were generally signed in Ohio or other midwestern locations along the overland trail. A small collection of promissory notes issued in the British Isles has amounts recorded in £s. Future research could potentially compare the British notes to the general ledger entries to verify the exchange rate.

[5]Except for the Civil War and immediate post-war years, the exchange rate varied between $4.89 per £1 in 1861 and $4.77 in 1878. During the war, inflation in the US caused the exchange to peak in 1864 at $9.91 per £1 and then taper back down (Officer 2004).

Tenure in the Church is defined as the time lag between baptism and emigration. It is identical to the dependent variable called "delay" in the simultaneous equations model (see chapter 4). Delay is endogenous to loan size because loan receipt could hasten the emigration of a convert. Loans were offered for the current season and could not be deferred, so loan receipt would have resulted in the immediate emigration of the recipient household. The model corrects for endogeneity by using instrumental variables (IVs). The instruments for delay are age at baptism and year of baptism. Neither variable would have been directly considered by the PEF agent, but each could have affected the emigrant timing decision. Age at baptisms could have affected emigrant wealth or income, so older converts may have been able to emigrate with shorter delays. Year of baptism serves as a time trend that measures differences in costs of emigrating at the time of conversion. Converts who joined the Church in later years would have benefitted from a better-organized emigration process and more developed economy in Utah. As the process became more streamlined the uncertainty associated with transportation and relocation would have decreased.[6] Unlike the simultaneous equations model of emigrant timing, this model does not include a quadratic term for delay. The quadratic term is omitted to avoid additional nonlinearities in the estimation.

Another factor present in this model and the simultaneous equations model but absent from previous work by other researchers is the size of the PEF annual fund. Annual fund size is estimated by summing the loans recorded in the Index to the PEF General Ledger (for a more detailed description, refer to chapter 3). Since Carson recorded only the presence or absence of a loan, he could not esti-

[6]Over time, the cost of transportation may have fallen, but I have not been able to find a reliable series for the cost of transportation from the British Isles to Utah. Arrington (1958) argued that the ticket price of transportation to Utah increased after Mormon emigration agents switched completely to steam ships and railroads. Previously, the voyage took longer but the overland passage could be subsidized with in-kind donations from Utah. Thus, it is not clear whether the total cost incurred by Church members at the port of departure decreased.

mate the total fund size. The annual fund is important to include in this model, because it accounts for the liquidity constraint faced by PEF agents. Given the emphasis placed by Church leaders on immediate emigration, it seems unlikely that PEF agents would have held back any significant portion of the fund for use in the following year. In other words, PEF agents did not attempt to smooth loan allocation across emigration seasons. Rather, they dispersed money as quickly as it was collected.[7]

If Carson was correct, then tenure and loan size will have a positive relationship. Increases in the annual fund should also be associated with more loans and larger loan amounts. The inclusion of tenure and fund size might reveal a greater roll for occupational targeting by the PEF agents. Other objectives are to determine whether loans tended to be larger for female-headed households or families with more workers.

Ferrie (1999) hypothesized that larger families tended to migrate west because they tended to be wealthier. If Ferrie's hypothesis is correct, then larger households would tend to receive less aid, but Carson found that larger families were funded by the PEF in greater proportions in 1868. Carson found no effect for household size in the earlier samples. I include two measures of household composition: total household size and the number of family members age twelve and older. Households including teen and young adult children are expected to receive relatively smaller

[7]A handful of loans made in the 1860s may contradict my assertion of no fund size smoothing. For the years 1863 to 1869, the PEF ledger index lists seven entries for loans issued to what appear to be business names rather than families: Cotton Machinery; Godbe & Mitchell; Walker Brothers; Eldredge & Clawson; T & W Taylor; Hooper and Eldredge; and H.L. Eldredge, Agt. The loan sizes for these borrowers are among the largest made throughout the life of the fund and total $50,000 combined. Additional research is needed to establish whether the loans were made to businesses or mixed families. Furthermore, the loans may have been issued to emigrant-owned businesses for the purpose of transporting capital equipment to Utah (as seams particularly likely in the case of Cotton Machinery).

loans per person, because the older children would have contributed to family savings.

The effect of gender on loan amount is not obvious. Many confounding influences could be associated with gender. From one perspective, female-headed households may have been more economically disadvantaged due to limited earnings as compared to men. Some of the women may have been better off, though, if they were receiving aid from their husbands already living in Utah. Furthermore, the PEF agents may have favored male-headed households over female-headed households if the agents were concerned about the ability of the women to be self-sufficient upon arrival in Salt Lake.

5.4 Estimation Results

The model is estimated as an instrumental variables Tobit model, following a Maximum Likelihood approach. Tobit estimation accounts for censoring of the dependent variable at zero, and the IV correction accounts for endogeneity between delay and loan amount. If the hypothesis of no endogeneity cannot be rejected then IV Tobit will still give consistent estimates, though Tobit without IVs may be more efficient. Results of the estimation are listed in table 5.1. Marginal impacts are reported at mean values for continuous variables.[8] For binary variables the marginal impacts are for discrete changes from zero to one. The results may be somewhat sensitive to the presence of heteroskedasticity which has not been corrected.

[8]See table 3.12 in chapter 3 for mean values of the variables.

Table 5.1: Tobit Estimation of Loan Amount Per Person, Full Sample.

	Coefficient	**Marginal Effect**
Delay	-0.367 (0.414)	-0.087 (0.098)
Highly Skilled	-4.275 (9.954)	-0.990 (2.257)
Skilled	5.774 (5.577)	1.386 (1.359)
Semiskilled	-4.373 (10.418)	-1.012 (2.359)
Missing Occupation	8.484 (6.503)	1.996 (1.520)
Household Size	0.842 (1.275)	0.199 (0.301)
Number of Workers	4.319 (2.282)	1.022* (0.539)
Female	1.808 (4.930)	0.429 (1.173)
Fund ($1000s)	8.664 (0.452)	2.049*** (0.089)
Constant	-85.882*** (7.348)	–
Sample Size	2,250	2,250

Standard errors in parentheses
* Indicates 1% significance
** Indicates 5% significance
*** Indicates 10% significance

A Wald test rejects the hypothesis of no endogeneity for tenure in the Church at the 1% level.[9] However, the coefficient on tenure (delay) is negative and imprecisely measured. It is surprising that the estimate is insignificant, but it does not necessarily mean that tenure has a negative effect on loan amount.[10] To the contrary, the results of the 3SLS estimation reported in chapter 4 indicate that the effect of delay on loan receipt is statistically significant for both the linear and

[9]The test statistic is 11.78 and follows a Chi-squared distribution with one degree of freedom.
[10]The estimated effect of an additional ten year's delay is to decrease the loan amount per person by about $0.87.

quadratic terms. The imprecision in the Tobit model can be attributed to the lack of efficiency of IV estimation.

The results for occupation skill level corroborate work by Carson. I find no evidence of systematic occupational targeting in the allocation of loans. Indicators of skill level are statistically insignificant both individually and as a group.[11] However, this estimation provides little support for Carson's hypothesis that PEF agents focused exclusively on helping long-term members of the Church, regardless of occupation. The estimated change due to delay is both small and not statistically significant. Once again, the large variance, relative to the coefficient on delay, can be attributed to the inefficiency of IV estimation.

Factors estimated to have the largest marginal impact on loan amount are the annual fund and number of workers in the household. A $10,000 increase in the annual fund above its mean value is associated with $2.05 increase in loan amount per borrower. It is significant at the 1% level. Likewise, an increase in the number of workers in a household will increase the amount by $1.02 on average. It is significant at the 5.8% level. Gender and household size are both positive but imprecisely measured.

Estimation was repeated with the dependent variable as real total loan amount for the household, rather than amount per person. The alternate estimation results were equivalent to the original model in both sign and statistical significance, with one exception. The only deviation from the original model was that household size had a positive, significant impact. The results for household size indicate that large groups tended to receive larger total loan amounts, but this is almost definitional

[11] A test of the null hypothesis that all four skill level variables are jointly insignificant produces a test statistic of 3.68. This follows a Chi-squared distribution with four degrees of freedom, so the null cannot be rejected at even the 10% level.

since emigration costs were higher for larger groups. Otherwise, the results were the same for both dependent variables. Fund size and the number of workers in the household were both significantly positively correlated with total loan amount, and the coefficients on delay and skill level were again imprecisely measured.

5.5 Sensitivity Tests

Sensitivity testing focusses on comparing my results to the work of Carson (1998). Carson estimated a binary measure of loan receipt using a Logit model. He modeled loan receipt as a function of occupation, gender, marital status, household size, and age at emigration. As a first pass, I replicate Carson's model using the new data collected for this project. Three factors prevent exact replication of the precise model. First, the new sample does not include a measure of marital status, whereas Carson's data did. Second, Carson estimated the model for three distinct time periods: 1854-55, 1864-66, and 1868. The new data do not include enough observations to estimate the model separately for each period. Instead, the model is estimated once, for the entire 1854-85 time period. Third, Carson developed his own classification system for occupations. Rather than use the Armstrong system, Carson divided occupations into five industry-specific groups: artisans, farmers, laborers, mechanics and potters, and textile workers. The laborer occupations correspond to unskilled workers (the base category for my estimation). Farmers are classified as intermediate occupations and are grouped into the high skill class for this estimation. All other groups are likely to be in the skilled or semiskilled classes.

Table 5.2: Tobit Sensitivity Tests on Loan Receipt or Loan Amount Per Person (Coefficients with Standard Errors).

Model	**Carson's Logit without annual fund**	**Carson's Logit with annual fund**	**Carson hybrid as an IV Tobit with delay and annual fund**
Delay	–	–	-0.656*** (0.244)
Emigration Age	-0.010 (0.023)	-0.011 (0.027)	-0.147 (0.757)
Emigration Age Squared	0.000 (0.000)	0.000 (0.000)	0.005 (0.009)
Highly Skilled	-0.172 (0.291)	-0.167 (0.340)	-1.688 (9.825)
Skilled	0.077 (0.163)	0.091 (0.196)	7.219 (5.499)
Semiskilled	-0.160 (0.303)	-0.055 (0.359)	-1.841 (10.253)
Missing Occupation	-0.641*** (0.177)	0.102 (0.213)	0.705 (6.051)
Household Size	0.135*** (0.025)	0.180*** (0.030)	1.741** (0.833)
Female	0.602*** (0.142)	0.145 (0.168)	6.069 (4.701)
Fund ($1000s)	–	0.340*** (0.015)	8.869*** (0.451)
Constant	-1.020** (0.407)	-3.163*** (0.493)	-92.436*** (13.990)

Standard errors in parentheses
* Indicates 1% significance
** Indicates 5% significance
*** Indicates 10% significance

Table 5.2 reports the estimates from replicating Carson's Logit selection model with the new data. The dependent variable for the Logit estimation is one if the household borrowed from the PEF, zero otherwise. The results are somewhat similar to Carson's findings. The probability of loan receipt tended to increase with household size, as Carson concluded in the 1868 sample. All else held equal, women were much more likely to receive loans than men–also consistent with Carson's results for 1868. Emigrants without an identified occupation were less likely to receive loans than those with unskilled occupations (the base category). A test of the joint significance of the occupation levels was driven by the significance of the missing occupation coefficient. When the test was repeated for the three identified skill levels, the hypothesis of no effect could not be rejected, confirming Carson's conclusion that occupation did not matter in the loan allocation process.[12]

Carson's Logit model was repeated with the addition of the annual PEF fund as an explanatory variable. As in my original model, the annual fund was significantly, positively correlated with loan receipt. The more money the PEF agents had to distribute, the more likely a household was to receive a loan. This is consistent with the Church goal to emigrate members as quickly as practicable. An interesting result is that the effects of gender and missing occupation completely disappear when annual fund is introduced to the model. The changes in coefficients suggest that estimated occupational and gender impacts were affected by omitted variable bias. When fund size is omitted from the model, coefficients for the two variables include the covariance of each with fund size. Fund size and missing occupation have negative covariance, and the coefficient on occupation is pulled downward

[12]Carson estimated the Logit model with the base category being a single woman without an identified occupation, but I specify the base category as an unskilled man. When I estimate the model using Carson's base, the coefficients on all four skill levels are positive (tending to increase loan receipt) and significant at the 10% level or better. All four occupation-effects switch sign and lose statistical significance when annual fund is included in the model. The test of joint significance of occupation is also rejected when annual fund is included in the model.

when annual fund is omitted. Fund size and gender, on the other hand, have a positive covariance. More women emigrated as household heads in years that the fund was large. Omission of annual fund increased the estimated effect of gender. (See table 5.3 for estimated means of these variables within the sample, by decade of emigration, and their estimated covariances with fund size.)

As a final point of comparison, a hybrid of Carson's model including annual fund and IV's for tenure was estimated using Tobit. For the Tobit estimation, the dependent variable is the amount borrowed per member of the emigrant household in real 1854 dollars (the same dependent variable used for my original estimation). These results are reported in the last column of table 5.2. As compared to my original model, the hybrid model includes the age at emigration with a quadratic term and excludes the number of workers in the household. Delay is instrumented using only the year of baptism. Age at baptism is dropped as an instrument in the hybrid model, because the of the presence of age at emigration. The difference between age at baptism and age at emigration is identically equal to tenure in the Church.[13]

As is the case whenever fund size is included, an increase in the annual fund tended to increase the amount loaned to each person. The impact is substantial and statistically significant at the 1% level. For those receiving loans, a $10,000 increase in the fund tended to increase loan size by $2.08 per person. As before, effects of occupation skill levels are not significantly different from zero, as confirmed by the test for joint significance. A difference from my original estimation is that household size has a significant positive effect in the hybrid model. However, the hybrid model does not separately include the number of workers, so I suspect the

[13]Another possible instrument for tenure is region of origin, but only one IV is required to identify the model.

effect is the result of omitted variable bias. A second difference is that the effect of delay now positive and statistically significant. Furthermore, exogeneity of delay is not rejected at the 10% level.[14] The results of the Tobit analysis of Carson's model were qualitatively the same when the total amount borrowed by the household was used as the dependent variable, so these results are not reported.

A second set of sensitivity tests were run to compare the results of estimation when segregating households by gender of the head. The dependent variable is again real loan amount per member of the household. The results are qualitatively similar to the original findings. Table 5.4 includes the results of these tests. Annual fund and number of workers have positive impacts on loan size for both genders. The effect of the annual fund is statistically significant at the 1% level for both genders, while the effect of the number of workers is precisely measured for the sample of men only. Occupational targeting cannot be tested for the estimation looking at women only, because the data rarely record women's occupations, but there is no evidence of occupational targeting when the annual fund is included in the model for men. The one minor difference in the gender-segregated models is that the impact of tenure in the Church is estimated with slightly more precision for the sample of women only. The estimated marginal impact of an addition year of delay in the women-only sample is to decrease real loan amount per person by about 27 cents. The effect is decidedly small (about 2% of the average loan) but significant at the 16% level. Both estimates reject exogeneity.

[14]The Wald test statistic is 1.18 with a p-value of 0.28.

5.6 Conclusions

The three biggest factors considered by the PEF agents when distributing loans were annual fund size, the number of household members age twelve and older, and tenure in the Church. The evidence is weakest regarding tenure in the Church, because the estimated effect is always small and close to zero. However, the exogeneity of tenure and loan amount is consistently rejected at the 1% level. The effect of tenure is more precisely measured in the simultaneous equations model in chapter 4. The combination of results suggests that tenure probably did affect loan allocation with deference given to long-time members.

The effect of annual fund size on lending was dramatic, yet predictable. As the fund increased, more individuals received loans and loan sizes tended to increase. The results are consistent with the goal to help as many people as much as possible as soon as possible. What is not obvious is why the fund sized was so varied throughout the life of the PEF. The fund was largest in the 1860s, with an average of $7,556 to lend each year. The average fund size dropped to $1,319 per year in the 1870s and tapered off to only $129 in 1885 (all amounts reported in 1854 dollars).

It is puzzling to explain why the fund was huge in the 1860s despite the American Civil War. Carson (1998) argued that Church leaders wanted to establish a large Mormon population before other immigrants arrived. Leaders may have increased fund raising efforts in order to help meet settlement goals. If true, then the drop off in fund size may have indicated that leaders felt the Mormon communities had achieved the required mass. Future research could focus on understanding why the annual fund varied so dramatically and whether the influences on the loan also affected other aspects of emigration.

This research confirms the conclusion of Carson that PEF agents did not systematically favor emigrants with particular occupations in the dispersal of loans. Occupation has no discernible affect on loan distribution unless annual fund is omitted. When annual fund is omitted, the category of missing occupation appears to be a significant detriment to loan receipt. Further examination of the data reveal that record keepers omitted occupation in the passenger lists in the same years that the annual fund was relatively small, the 1870s and 1880s. Thus, what little evidence there is for occupational bias is rightly attributed to omitted variable bias and the covariance in recording and fund size.

A final result of interest is that gender apparently played no role in loan allocation. Carson found a slight bias towards funding female-headed households in 1868, but he found no gender bias in his early years. Scant evidence in this research suggests that women may have been favored, but the effect is washed out with the inclusion of annual fund size. Examination of the data reveals that women were more likely to emigrate as household heads in the 1860s, and during this time period the annual fund was at its peak.

Table 5.3: Movement of PEF Fund Size and Other Variables

(a) Means and Proportions by Decade of Emigration

	1850s	**1860s**	**1870s**	**1880s**
Fund ($1000s)	2.62	7.56	1.32	0.40
Female	0.29	0.37	0.40	0.35
Borrowers	0.11	0.61	0.19	0.06
Loan Amount per Person	4.67	23.16	9.27	2.36
Unidentified Occupation	0.36	0.47	1.00	0.90
Sample Size	893	758	306	293

(b) Estimated Covariance

	Fund	**Female**	**Borrower**	**Loan per Person**	**Missing Occupation**	**Emigration Decade**
Fund ($10,000s)	1	–	–	–	–	–
Female	-0.001	1	–	–	–	–
Borrower	0.5373	-0.0037	1	–	–	–
Loan Amount per Person	0.3623	0.0246	0.7022	1	–	–
Missing Occupation	-0.1817	0.6088	-0.0945	-0.0636	1	–
Emigration Decade	-0.1854	0.0651	-0.0064	0.0011	0.4449	1

Table 5.4: Tobit Estimation of Loan Amount Per Person by Gender of Household Head (Coefficients with Standard Errors).

	Men Only	**Women Only**
Delay	-0.008 (0.472)	-1.141 (0.813)
Highly Skilled	-3.481 (9.834)	–
Skilled	6.127 (5.510)	–
Semiskilled	-3.849 (10.291)	–
Missing Occupation	5.562 (6.667)	–
Household Size	0.444 (1.441)	2.764 (2.771)
Number of Workers	4.526* (2.569)	2.717 (5.060)
Fund ($10,000s)	8.480*** (0.558)	8.930*** (0.784)
Constant	-86.966*** (8.142)	-71.065*** (10.607)
Sample Size	1,482	768

Standard errors in parentheses
* Indicates 1% significance
** Indicates 5% significance
*** Indicates 10% significance

CHAPTER 6

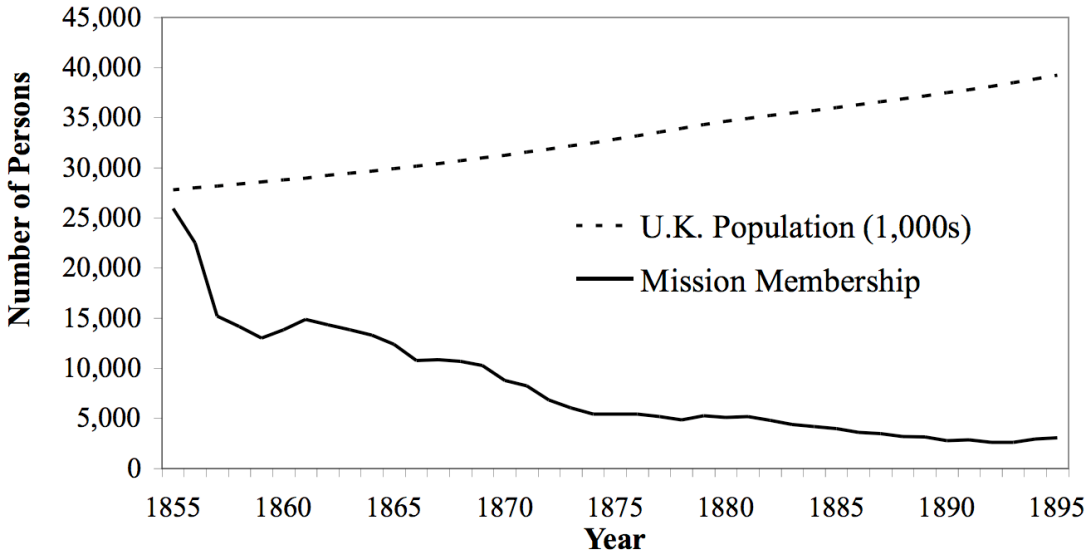
TIME SERIES ANALYSIS OF MORMON EMIGRATION

Mormon emigrants looked to "gathering" for religious, political, and economic relief. The influence of their new religion in some ways differentiated them from their contemporary fellow emigrants, but the extent to which the religious differentiation altered the decision-making process of Mormon emigrants is not clear. Did adherence to the doctrine of gathering overshadow the traditionally influential economic factors? The goal of this chapter is to test whether macroeconomic conditions affected the emigration patterns of the Mormon emigrants as it did overall emigration. I also hope to determine the role of PEF generosity in annual emigration patterns. Estimation follows conventional time series models of emigration, to the extent that data are available for Utah. Additional controls are included to account for religious and political influences affecting the Mormon emigrants in particular.

6.1 Defining the Emigration Rate

Time series analysis of emigration models the *rate* of emigration rather than the absolute level. Annual emigration rates are defined as the number of people emigrating as a fraction of the total population of the source country. By using emigration per thousand in the population, it becomes easier to compare the statistics for countries with different size populations. For Mormon emigration, the appropriate denominator is not obvious. The Mormon emigration rate can be examined as a fraction of the British population. This approach is reasonable, because Mormon converts were a subset of all British emigrants.[1] On the other hand, reporting Mor-

[1]This approach was suggested to me by Asaf Zussman.

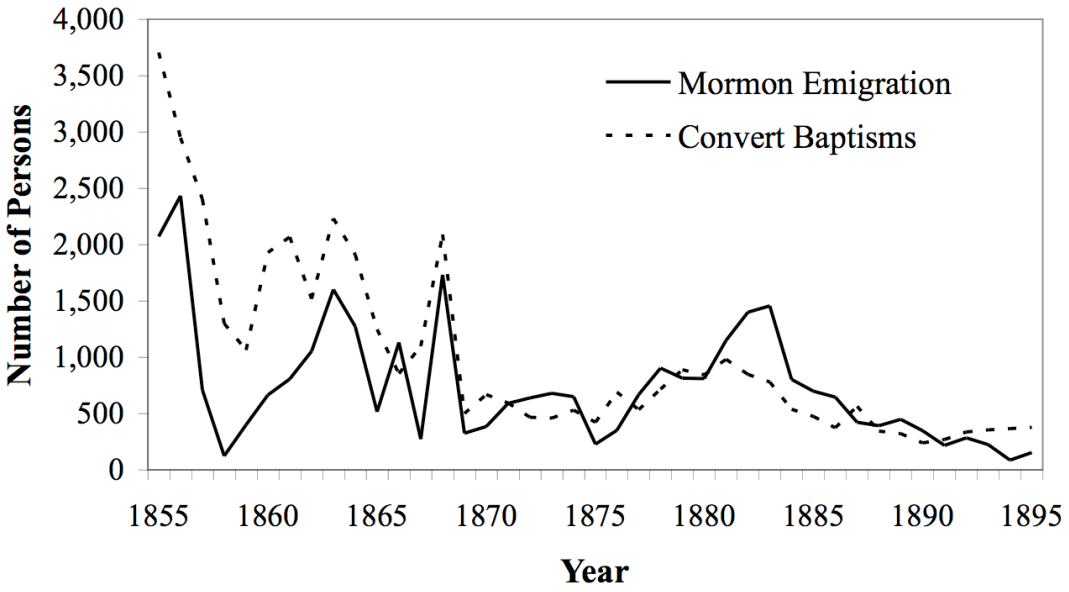


Sources for Mission Membership: European Mission Statistical Record, 1855 to 1876; *Millennial Star* 40:19, 47:142, 48:142, 49:158,50:142, 53:88, 54:86, 55:162, 56:230, 57:182-3, 58:158.
Source for UK Population: Officer (2003).

Figure 6.1: Total Population Compared to LDS Membership, British Isles, 1850-95.

mon emigration as a fraction of British population is a bit like reporting French emigration as a fraction of the population of Europe. An individual could not be a Mormon emigrant without first becoming a member of the Church, so total Church membership seems to be a more reasonable denominator.

The use of total Church membership as the relevant denominator is somewhat problematic, because Church membership fluctuated year-to -year. Overall, Church membership in the British Mission declined dramatically between 1855 and 1895 as seen in figure 6.1. In contrast, total population for the country tended to slowly increase at a fairly steady rate, despite emigration. Fluctuation in Church membership can be understood through the interplay of baptisms and emigration. The twin goals of universal emigration and proselytizing formed the balancing point of a seesaw (see figure 6.2). In the 1850s, convert baptisms outnumbered emigra-



Sources: European Mission Statistical Record, 1855 to 1876; *Millennial Star* 40:19, 47:142, 48:142, 49:158,50:142, 53:88, 54:86, 55:162, 56:230, 57:182-3, 58:158.

Figure 6.2: Annual Baptisms and Emigration in the British Mission, 1855-95.

tion and total membership rose. Later, convert baptisms did not keep pace, and total membership decreased. Research using emigration as a fraction of Church membership is subject to greater fluctuation in the denominator than other emigration rates calculated as a fraction of total population.

The challenge of fluctuation in total membership is further complicated if the number of members was affected by economic conditions. At the risk of oversimplifying the conversion process, economic factors may have come into play through several avenues. For instance, conversion rates may have been higher during periods of economic downturn in the British Isles. People may have been more open to religious themes when they were struggling financially. To the extent that baptism also represented intention to emigrate, emigration may have seemed a more attractive option during economic hard times. "Poor weather friends" who joined the

Church when times were tough, may have also left the Church as economic conditions improved. In nineteenth century Britain, it was common for large numbers of members to leave the Church for a variety of reasons. Individual membership records often reported a member was "cut off by her own accord."[2]

Economic conditions may have also affected the number and quality of missionaries preaching in the British Isles. Missionaries served as volunteers, at their own expense. Some were native Brits while others came from Utah. General economic conditions may have made it easier or harder for individuals to serve in such a capacity. The number of missionaries serving in a particular area was not recorded, but it seems reasonable to assume that a larger number of active missionaries in a location would tend to increase the number of convert baptisms, all else held equal. Thus, exogenous factors affecting the number of emigrants may have also affected the total membership pool from which emigrants were drawn.

Ultimately, both possible denominators for the Mormon emigration rate have relative merits and weaknesses. Emigration as a fraction of Church membership has greater intuitive appeal, since an individual could not be a Mormon emigrant without first becoming a member of the Church. This definition yields rates of emigration that were much higher than comparable rates for other populations. The appropriately high rates reflect the culture of "gathering" within the Church.

Emigration as a fraction of the total British population has the advantage of a denominator virtually independent of economic influences. By this measure, the Mormon emigration rate is put in a national context, and the rates are appropriately low. The rates can be interpreted as those choosing to emigrate with a

[2]Annual administrative records of the British Mission included counts of the number of members who were baptized, emigrated, died, or left the Church during the year. See the caption to figure 6.2 for original source citations.

Mormon company. However, not all would-be emigrants had the opportunity to emigrate with a Mormon company. Exposure to Mormon missionaries was not uniformly distributed throughout the country, and overall exposure to the Church was was relatively limited. Plus, this interpretation understates the role of conversion in motivating an individual to emigrate. Absent a clear reason for selecting either definition, the rate of Mormon emigration will be calculated both ways, and the model will be estimated using each definition.

The hypothesized results are that Mormon emigration as a proportion of total British population followed patterns similar to that of emigrants outside the religion. In other words, emigration tended to increase as relative economic conditions improved abroad. Secondly, Mormon emigration as a proportion of Church membership is expected to increase with economic conditions in both the UK and Utah. Positive correlation with conditions in Utah would have reflected greater motivation to improve one's lot by relocating, while positive correlation with conditions in the UK would have reflected the ability of would be emigrants to gather enough cash to pay for passage.

6.2 Economic Influences

Emigration flows were affected by economic conditions in both the source and destination countries. As explained by Hatton, potential emigrants decided whether and when to move by comparing expected utility streams at home and abroad.[3] Hatton modeled utility as the natural log of income, where expected income depended on known wage and employment rates. Emigration was only selected when

[3]See, for example, Hatton (1995), Hatton and Williamson (1998), or Chiswick and Hatton (2003).

Table 6.1: Persons Engaged in Gainful Occupation in Utah, 1870-1900.

Year	**1870**	**1880**	**1890**
Total Population	86,786	143,963	207,905
Population 10 years and older	56,515	97,194	147,227
Population Gainfully Occupied (age 10+)	21,517	40,055	66,901
Percent Gainfully Occupied (age 10+)	38.1	41.2	45.4
Percent Gainfully Occupied (all ages)	24.8	27.8	32.8

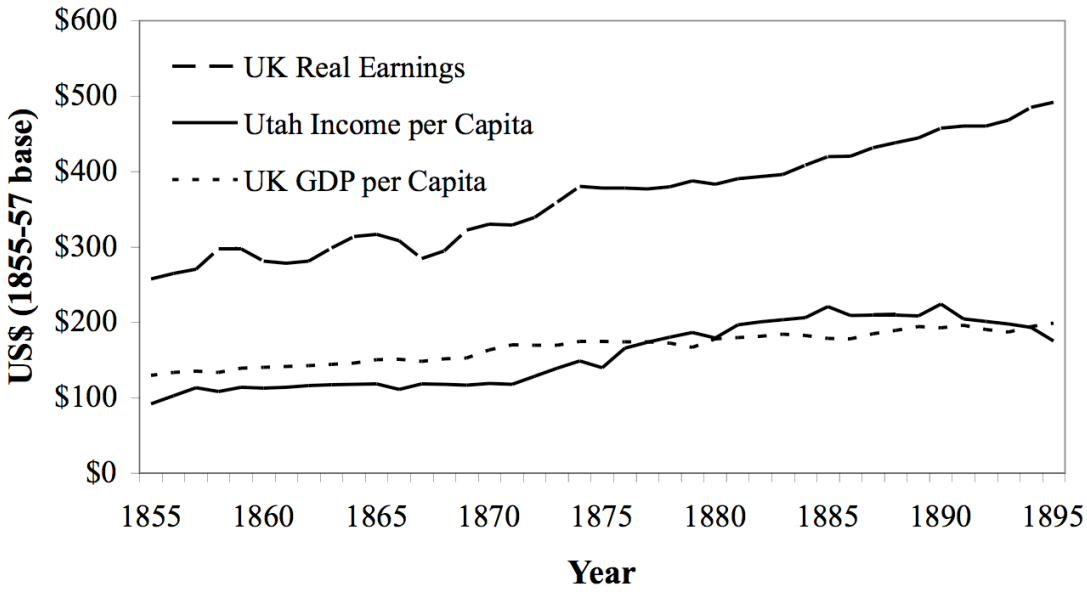
Source: "Measures of Economic Changes in Utah, 1847-1947." *Utah Economic and Business Review*, vol. 7, no. 1. Dec 1947, page 23.

the expected gain was greater than transportation and nonpecuniary costs of moving. Here, the source is Britain, and the destination is narrowly defined as the territory of Utah. Economic indicators are needed for both locations.

Economic indicators for Britain are relatively well-established, while those for Utah are more limited and less well-known. Boyer and Hatton (2002) published new estimates of British employment rates for 1870-1913. Boyer has extended these estimates back to 1851 using data from the Board of Trade and earlier estimates calculated by Feinstein (1972).[4] Unfortunately, employment rates for Utah can only be estimated for 1870, 1880, and 1890. US Census returns for these years report the number of individuals, age ten years and older, who were gainfully occupied (see table 6.1). Given the sparseness of the data, Utah employment rates are not included in the estimation.

Feinstein (1995) published estimates for real earnings for manual workers in Britain for 1790-1990. His estimates are converted to US dollars using estimates of the real exchange rate from Officer (2006). Wages are not available for Utah, per se, in part because a large proportion of Utah's population was employed as non-wage-earning farmers. However, estimates of average annual income are available

[4]The author wishes to thank George Boyer for sharing his complete, unpublished unemployment rate series.



Source for UK real earnings: Feinstein (1995).
Source for UK GDP per capita: Officer (2006).
Source for Utah Income per capita: Israelsen (1982).

Figure 6.3: Per Capita Income and Earnings, 1855-95.

for 1855-95. Israelsen (1982) estimated income for Utah using tithing records. As seen in figure 6.3, per capita income growth in Utah was fairly flat between 1855 and 1870. However, income increased after 1870 and continued to grow until 1895. The increase in per capita income growth coincided with the completion of the transcontinental railroad at Promontory Point, Utah, on 10 May 1869 (Utley and Ketterson, 1969). The railroad facilitated trade between Utah and the rest of the country. Not only was it quicker and easier to transport commodities to eastern markets, but also rail passengers bound for the west coast saw Utah as their final opportunity to obtain needed supplies. In both senses, the railroad provided economic opportunities not previously available in Utah due to geographic isolation (Arrington, 1958).

Israelsen's estimates are based on household-level Church tithing records.[5] Israelsen observed tithing records for eleven of the forty-one years. For the years not observed by Israelsen, I interpolate income estimates using splines. I regress income on time and time-squared using ordinary least squares (OLS). The estimated coefficients are then used to find the projected value of income for the missing years. The time series is split into two periods, at 1870, and splines are estimated for each period. For both time periods, the splines fit well, as measured by R^2. For the first time period, 1855-70, R^2 is 0.844. For the second time period, 1870-95, R^2 is 0.986.

Annual income and real earnings do not measure precisely the same things. The Utah income estimates are based on total earnings from all sources, so they include non-wage earnings, while the Feinstein estimates for the UK refer only to wage earnings. An alternative measure for the UK is GDP per capita (Officer, 2003). In some sense, Israelsen's income series could be used to estimate GDP for Utah, but the estimate would tend to be too low since a substantial number of Utah immigrants donated time to public works projects. For example, immigrants voluntarily helped dig irrigation canals to water their farms, but the value of the canals is not directly included in household income (Israelsen, *personal correspondence*).[6] Though neither comparison is ideal, the comparison of real earnings to annual income seems the most reasonable pairing.

Generosity of the PEF was an economic influence unique to Mormon emigrants. PEF passage was available only to Church members gathering to Utah. Generosity of the PEF is defined as the budget available for lending divided by the pool of

[5]For greater detail, refer to chapter 2.

[6]The value of the public works projects should be included in GDP, but it would not be reflected in household income. Future research may be able to estimate the value of public works projects, either in raw terms or as a percentage of GDP.

emigrants vying for loans. The amount of money available to provide PEF passage to emigrants varied dramatically, depending on donations and on remittance rates in Utah. I estimate annual fund size using the index to the PEF general ledger, as explained in chapter 3. The PEF ledger index reports loan amounts in nominal US dollars. I deflate these dollar amounts to an 1854 base using the consumer price index created by Officer (2007). The pool of emigrants potentially vying for PEF loans is defined as the number of Church members living outside of Utah as reported in Avant (2006).[7] As the fund size increased, relative to total membership, I expect to observe higher emigration rates.

It is important to note that availability of prepaid passage would have affected emigration in general. Due to the informal nature of the emigration assistance from family and friends, it is generally impossible to measure the availability of prepaid passage outside the Mormon emigration setting. For Mormon emigrants, the lending was channeled primarily through the PEF, and PEF generosity can be observed.

6.3 Effect of Other Influences

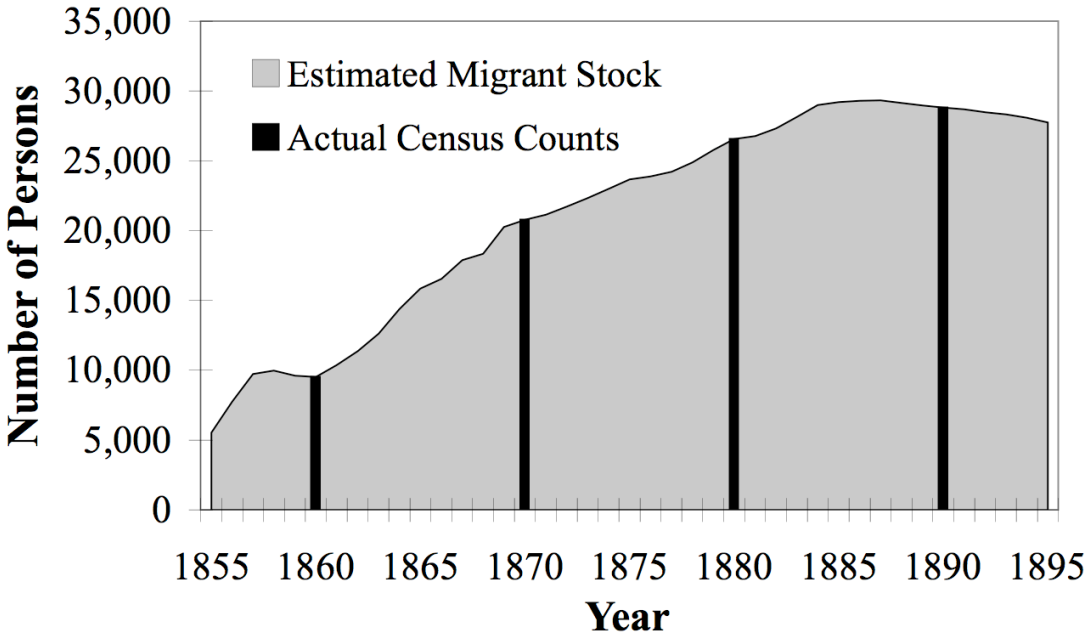
Two other influences are commonly included in the literature. Both relate to the presence of fellow countrymen who previously emigrated to the chosen destination. One measure is the total stock of emigrants in the destination country. The other is lagged emigration to the destination. The effects are generally explained as increasing emigration by lowering costs of resettlement, but the full mechanism is

[7]Avant (2006) does not specify the number of Church members by place of residence, rather total membership is broken down by type of ecclesiastical unit. For the time period of this research, Church members were organized into "missions" if they resided outside of Utah, while members within the Utah area were organized into "stakes."

not fully understood. The presence of compatriots in the destination country may have facilitated job search, language acquisition, and other cultural adaptation. A large and active emigrant flow may have also increased the flow of information on preparation for and gains to emigration. In keeping with the model suggested by Hatton, both total stock and lagged emigration (a one period lagged dependent variable) are included in this research.

Total migrant stock, or the number of British emigrants who already arrived in Utah, is based on census records. Starting with the first US census to include Utah, in 1850, enumerators recorded individuals' birthplace. Intercensal years are difficult to estimate, because annual population increases, by birthplace are not available. The rough, but hopefully reasonable, approach used for this project is to interpolate migrant stock using counts reported in statistical reports of the British Mission. I estimate the 1851 migrant stock as the sum of the 1850 census total and the 1851 reported emigration flow. The 1852 migrant stock is the sum of the 1850 census total and the emigration flows reported by the Mission for 1851 and 1852. Figure 6.4 charts the estimated migrant stock for the time period.

In all decades, there is a difference between the change in migrant stock recorded in the census and the sum of Mormon emigration from the British Isles. The difference can be explained in part by the fact that not all British emigrants traveled directly to Utah. Some British emigrants were introduced to the Church and baptized after resettling in the United States. Converts in North America were encouraged to gather to Utah, the same as converts in Europe. The total stock of Britons in Utah consisted both of emigrants who converted in the British Isles and who converted after arriving in North America, and the travel flows of post-emigration converts are not well-documented. Another complication is that some



Source: *Utah Economic and Business Review*, December 1947, p. 13.

Figure 6.4: Estimated Stock of British-born Immigrants Residing in Utah.

pre-emigration converts were unable to travel directly to Utah within the same year that they left their homes, due to illness, finances, or preference.[8] A final complication is that migrant stock experienced some amount of natural decrease due to death of emigrants en route and after arrival. To account for the discrepancy between census observations and the emigrant flows reported by the Mission, I spread the difference evenly across each intercensal year.

6.4 Methods

The complete sample consists of forty-one annual observations, including the year 1855 through 1895. Summary statistics for the data are reported in table 6.2. The

[8]Future research may be able to quantify the annual arrival in Utah of British converts, baptized both in the US and abroad, using the "Overland Trails" list at the Family History Library.

Table 6.2: Summary of Time Series Variables.

Variable	Mean	Description
Emigration Rate 1	108.6	Number of Mormon emigrants per 1,000 Church members in the British Mission
Emigration Rate 2	23.5	Number of Mormon emigrants per million in the UK population
UK Real Earnings	£74.47	Estimated by Feinstein (1995) (1855-57 base)
UK Employment Rate	94.0%	Estimated by Boyer and Hatton (2002)
UT Real Income per Capita	$156.73	Based on estimates by Israelsen (1982) (1855-57 base)
PEF Fund Generosity	$1,012	Size of Fund per 1,000 Church members outside of Utah (1854 base)
UT Migrant Stock	213.5	Utah residents born in the British Isles (in hundreds)

complete model is described by the following equation:

$$\begin{aligned}\text{emigration rate}_t &= \alpha_0 + \alpha_1 \ln(\text{UK earnings})_t + \alpha_2 \Delta\ln(\text{UK earnings})_t \\ &\quad + \alpha_3 \text{UK employment rate}_t \\ &\quad + \alpha_4 \ln(\text{UT earnings})_t + \alpha_5 \Delta\ln(\text{UT earnings})_t \\ &\quad + \alpha_6 \text{UT Migrant Stock}_t + \alpha_7 \text{emigration rate}_{t-1} \\ &\quad + \alpha_8 \ln(\text{PEF Annual Fund})_t + \alpha_9 \Delta\ln(\text{PEF Annual Fund})_t \\ &\quad + \alpha_{10} \text{trend} + \epsilon_t \qquad (6.1)\end{aligned}$$

Within the literature, economics indicators are included as ratios to account for the relative attractiveness of each area. I am unable to use relative ratios because of data limitations for Utah. The inclusion of both levels and first differences is common within the literature, and the model follows this convention.

Estimation employs ordinary least squares. As with all time series, estimation is potentially subject to serial correlation in the disturbance. The inclusion

of the lagged dependent variable violates the assumption of strict exogeneity of the regressors required for the Dickey-Fuller, so the Breusch-Godfrey test is used instead. Breusch-Godfrey is an LM estimator that can test for higher-order serial correlation even if the regressors are not strictly exogenous. If exogeneity is not violated, the Breusch-Godfrey estimator is still valid (Greene, 2000).

6.5 Results

Estimates are qualitatively similar for both definitions of the Mormon emigration rate. Table 6.3 presents the results for both definitions of the emigration rate. The first four specifications are estimated for Mormon emigration as a fraction of Church membership. The model is estimated multiple times, according to different specifications. Specification I(a) and I(b) regress emigration on the independent variables in levels only, and I(a) includes a time trend. Specification II includes regressors in levels and adds in first differences. Specification III is identical to I(b) with the addition of the PEF annual fund.

In all four specification, the coefficient on income in Utah is positive and statistically significant at the 1% level, and the coefficient on UK earnings is negative and statistically significant at the 10% level (or better). The effects of the British employment rate, the lagged emigration rate, and the migrant stock in Utah are consistently positive, but small and imprecisely measured. Most importantly, the Breusch-Godfrey LM test finds no evidence of serial correlation in any of the specifications. When the annual fund is added, its estimated effect is positive and precisely measured, meaning a ten percent increase in the size of the fund tended to increase the emigration rate by about one percent.

Specification I(a) is the only reported estimation that includes the time trend. As noted, the coefficient on the time trend is not significantly different from zero. Estimated coefficients in I(a) and I(b) are roughly equal in magnitude, and the standard errors are smaller when the time trend is omitted. The same pattern was observed when specifications II and III were estimated with the time trend, so those results were not included in the table.

The last two columns of table 6.3 report estimation results for Mormon emigration as a fraction of UK population. Standard practice in the literature is to report emigration per thousand in the population, but I report estimates for emigration per million in the table. The reason for choosing the larger denominator is purely pragmatic: Mormon emigration was so small, compared to the UK population, that results become uninformative at reasonable levels of reporting accuracy unless I use the rate per million in the population. Using three decimals of accuracy for the rate per thousand, the coefficients are zero for both migrant stock and the time trend, even though time trend is significant at the 10% level. Hence, I report coefficients per million in the population in the table. For this discussion of the results, however, I convert the coefficients back to the rate per thousand UK population so the results can be more readily compared to other research.[9]

Estimation results for the rate of Mormon emigration, relative to the UK population, are reported for two specifications. Serial correlation was detected when the emigration rate was regressed on levels only, so the results are not reported for specifications I(a) or I(b). Autocorrelation is purged from the disturbances when first differences and a time trend are added to the model. This is the same as

[9]To convert estimates to coefficients and standard errors for emigration per thousand, simply divide the reported numbers by 1,000. This is true for all variables except the lagged emigration rate, which is unchanged by differences in scale. Statistical significance is not affected by changing the scale of the dependent variable.

Table 6.3: OLS Time Series Estimation of LDS Emigration Rate.

	Per 1,000 Church Members				**Per million UK Population**	
	I(a)	**I(b)**	**II**	**III**	**II'**	**IV**
ln(UK Earnings)	-542.208** (219.175)	-526.638*** (143.252)	-769.482*** (196.352)	-280.226* (159.999)	-243.350*** (83.103)	-210.600*** (38.354)
Δln(UK Earnings)	–	–	434.307 (278.345)	–	142.685 (91.269)	93.783** (40.961)
UK Employment	4.364 (3.428)	4.282 (3.270)	5.933 (4.187)	4.904 (3.011)	102.754 (123.151)	127.610** (55.927)
ΔUK Employment	–	–	2.581 (3.952)	–	120.549 (115.941)	-42.067 (54.846)
ln(UT Income)	323.999*** (94.340)	325.284*** (91.993)	461.090*** (121.552)	366.036*** (85.808)	57.703* (29.338)	58.436*** (13.087)
Δln(UT Income)	–	–	-219.115 (164.609)	–	-6.065 (48.567)	-27.470 (22.349)
Migrant Stock	0.542 (0.370)	0.559 (0.320)	0.758** (0.333)	0.096 (0.340)	-0.080 (0.106)	-0.494*** (0.092)
Lagged Y	0.247 (0.160)	0.244 (0.153)	0.079 (0.179)	0.190 (0.142)	0.149 (0.156)	-0.001 (0.077)
ln(Annual Fund)	–	–	–	11.226** (4.149)	–	8.555*** (1.244)
Δln(Annual Fund)	–	–	–	–	–	-9.501*** (2.119)
$\Delta_2$ln(Annual Fund)	–	–	–	–	–	4.691*** (0.946)
Time Trend	0.373 (3.931)	–	–	–	2.522* (1.348)	5.819*** (0.904)

Standard errors in parentheses * 1% significance ** 5% significance *** 10% significance

specification II with a time trend, so the column is labeled II'. When the log of the annual fund is added to the model, autocorrelation again emerges. Even with the first and second differences in the annual fund, higher order serial correlation is not eliminated. Even with the time trend and second differences for the annual fund, the Breusch-Godfrey LM test rejects the null of no first order serial correlation at the 1% level. Despite the problem with serial correlation, the results of this model are reported under the label of specification IV.

6.6 Discussion

Despite the challenge of autocorrelation, the estimates with UK population as the denominator of the emigration rate are remarkably similar to the estimates with Church membership in the denominator. In all six specification, emigration tends to increase with income in Utah and decrease with earnings in the UK. A ten percent increase in income in Utah tended to increase emigration by 324 to 461 persons per thousand members. The same change would increase emigration per thousand population by about 0.058. Conversely, a ten percent increase in average earnings in the UK tended to decrease emigration by 280 to 769 persons per member or by 0.211 to 0.243 persons per thousand UK population. Differences in the magnitudes of the effects for the two dependent variables are due to the use of different denominators for the emigration rate. The emigration rate is much smaller for the UK population as opposed to the mission membership.

Hatton and Williamson (1995, p. 66) report that a ten percent increase in the overseas wage relative to the home wage would tend to increase emigration by about two per thousand. The coefficients are not directly comparable because

I used different variables. I was unable to estimate the relative wage ratio, since there are no established wage series estimates for Utah. However magnitudes in my estimation seem much smaller overall for emigration per thousand in the UK population. This is perhaps due to the narrowness of my defined emigrant group. Hatton and Williamson pooled all emigrants together and used an average wage rate for a more broadly-defined destination, whereas I specifically look at the destination of Utah.

A major difference between my results and those of Hatton and Williamson is for the effect of the employment rate. Hatton and Williamson observe the employment rates tend to dominate wage effects when both are included in the model. I do not have a measure of employment in Utah, but I include a measure for the UK. Far from dominating the wage effect, I find the opposite. Employment rates in the UK appear to have no measurable effect on Mormon emigration rates for either denominator.[10] This is a surprising finding for which I do not have a clear explanation.

The effect of migrant stock in Utah is also smaller in my estimates than as reported by Hatton and Williamson. An one thousand person increase in the migrant stock in Utah tended to increase emigration by only 0.005 people per year. Only seven years in the sample saw increases of a thousand or more in migrant stock, so the change is particularly small. Hatton and Williamson found effects that were larger by several orders of magnitude.

Because I look only at emigration to Utah, estimation is prime for the study of two discrete historical events: Johnston's Army and completion of the Transcontinental Railroad. In 1857, Colonel Albert Sidney Johnston led United States army

[10]In specification IV, the UK employment rate has a positive impact on emigration, but the estimation is subject to first order autocorrelation.

troops into the Utah Territory. In response to the dispute, Brigham Young ordered a halt to Mormon emigration from October 1857 to October 1858.[11] The completion of the Transcontinental railroad also had a potentially dramatic effect on emigration. Once the railroad was completed, overland transportation from the port of arrival to Utah could be completed entirely by rail rather than by wagon or on foot. That same year, Church emigration officials decided to abandon sailing ships in favor of steam-powered ships for all transoceanic voyages. The adoption of all steam-powered transportation shortened the emigrant journey substantially.

I examine the effects of these two historical events by including two binary variables in the model of emigration. I include one variable to indicate the two years affected by Johnston's Army. I include a second indicator variable equal to one for all seasons after the completion of the Transcontinental Railroad. I would expect the coefficient on Johnston's Army to be negative, since emigration was temporarily halted in response to the change in political climate. I would expect emigration rates to be higher after the adoption of steam transportation, since steam travel was quicker and therefore less costly.[12] Unfortunately, the estimated results are not as clear-cut as the predictions.

Table 6.4 presents the results of estimation including the two event studies. When the dependent variable is emigration per 1,000 Church members, I report the results for two variants of specification III. Specification III-E(a) includes the two event studies, the PEF annual fund, a time trend, and the other dependent variables measured in levels only. Specification III-E(b) is the same as III-E(a) with the time trend omitted. Neither specifications yield coefficients for Johnston's Army and steam travel that are significantly different from zero.

[11]For more discussion of Johnston's Army and the Utah War, refer back to chapter 2 or see Arrington (1958).

[12]See chapter 2 for a more discussion of the impact of the railroad on Mormon emigration.

Specification IV-E is estimated for the emigration rate per million UK population. The independent variables include the two event studies, a time trend, and the other independent variables measured in both levels and first differences. The PEF annual fund is measured in levels and first and second differences. Estimated coefficients for the event studies are slightly more precise, but they are still relatively uninformative. Similar to specification IV in table 6.3, the Breusch-Godfrey LM test indicates the presence of serial correlation.

Taken together, the three models yield a negative effect of steam travel on emigration rates, but lack consensus on the direction of the effect of Johnston's Army. The negative coefficients for steam travel tend to support Arrington's claim that the higher ticket price for railroad transportation made emigration more difficult for Mormon converts. This interpretation is not compelling because earlier forms of transportation, namely wagon train, were still available for emigrants. Since Church leaders could have continued to use the slower substitute forms of transportation, it seems unlikely that ticket price was the sole cause of any decline in emigration rates. A more compelling conclusion is that the model is simply unable to provide reliable estimates for the effect of steam-powered travel on emigration.

6.7 Conclusions

Mormon emigration responded to economic forces in a manner that is similar to other migrants. As economic prospects in the destination country improved, emigration rates increased. Conversely, as economic conditions at home improved, emigration dropped. The results are at the same time surprising and obvious. One might expect emigration rates of a religiously-motivated community to move

Table 6.4: OLS Time Series Estimation with Event Study Variables.

	Per 1,000 Church Members		**Per 1,000 UK Population**
	III-E(a)	**III-E(b)**	**IV-E**
ln(UK Earnings)	-423.998* (230.631)	-227.043 (166.542)	-162.316*** (41.514)
Δln(UK Earnings)	–	–	100.916** (40.433)
UK Employment Rate	6.898* (3.571)	5.116 (3.287)	109.836* (60.127)
ΔUK Employment Rate	–	–	-23.108 (55.473)
ln(UT Income)	348.767*** (86.980)	346.817*** (87.662)	49.696*** (12.956)
Δln(UT Income)	–	–	-13.921 (21.851)
Migrant Stock (in 100s)	-0.161 (0.546)	0.277 (0.415)	-0.334*** (0.111)
Lagged Y	0.220 (0.147)	0.197 (0.147)	0.021 (0.0879)
ln(Annual Fund)	15.660*** (5.144)	12.568*** (4.517)	7.630*** (1.413)
Δln(Annual Fund)	–	–	-7.553*** (2.169)
$\Delta_2$ln(Annual Fund)	–	–	3.908*** (1.023)
Johnston's Army	7.424 (38.814)	-12.982 (36.009)	-5.302 (8.432)
Steam Travel	-23.779 (36.907)	-39.077 (35.032)	-12.320* (6.458)
Time Trend	5.864 (4.791)	–	4.589*** (1.024)
Constant	-646.956 (876.486)	-1,256.954* (726.780)	-88.715 (286.584)

Standard errors in parentheses
* Indicates 1% significance
** Indicates 5% significance
*** Indicates 10% significance

independently of earnings, especially because Church leaders urged swift emigration of all converts. The same logic implies that analysis of Mormon emigration might not be easily generalized to other populations. However, my results indicate that economic forces did affect the emigration patterns of the community.

The attention to practical circumstances beyond religion is probably one of the key reasons the Salt Lake City settlement was able to establish roots, expand, and survive for more than a century. Ongoing, regular communication between Salt Lake and the British Mission appears to have provided excellent information to emigrants about conditions in Utah and along the trail. Lack of such attention could have spelled disaster for those already living in the isolated frontier as well as those hoping to gather. The ability to face reality squarely while preaching religious doctrine supports the claim that research using Mormon emigrant data is generalizable to emigration with non-religious motivations.

CHAPTER 7

CONCLUSION

7.1 Introduction

The Perpetual Emigrating Fund (PEF) and Mormon emigration records provide a unique glimpse into nineteenth century emigration from the British Isles. Unlike other emigrants, Mormon emigrants reported their intention to emigrate a year or more in advance of actually making the move. This was done indirectly at the time of convert baptism. Baptism represented not only conversion to a new faith but also a commitment to "gather with the Saints" by emigrating to North America. The double-meaning embedded in convert baptism makes it possible to investigate the timing of emigration after the decision to emigrate had been made. For other emigrants no such investigation can be made, because there is no central registry of persons intending to emigrate other than the actual passenger lists made at the time of boarding.

A second insight available for Mormon emigrants is gleaned from records of the PEF: the precise dollar amount of financial assistance received towards the cost of emigration. Comparable financial records are not generally available for other emigrants, because assistance was most commonly provided through informal credit markets based on kinship ties. The PEF essentially institutionalized kinship-type lending for members of the Mormon community, using religious affiliation and desire to "gather" as the common bond traditionally filled by family. PEF loans were similar to kinship loans in purpose, terms, and methods of collection enforcement (or lack thereof). Both were designed to aid in transportation to a new home, and neither used coercion or legal action to enforce repayment. The

important difference is that PEF loans were centrally documented, and they can be directly linked with emigration records.

The uniqueness of the records kept by this religious community ought not to preclude the generalization of my analysis to the broader population. To the contrary, time series analysis of the rate of Mormon emigration demonstrates that this community was not dissimilar from other emigrants. Mormon emigrant flows clearly responded to changes in economic conditions in both the source and destination countries. The responses mirrored those of other emigrants, as estimated in the existing literature. Furthermore, Mormon emigrants shared many characteristics with other settlers of the Western frontier and specifically with earlier British emigrant groups. In sum, conclusions based on Mormon records have important implications for other emigrants who did not share their faith.

7.2 Implications for Prepaid Passage

Loans provided by the PEF were given in the form of prepaid passage to Utah. This research breaks ground on the study of prepaid passage because quantitative PEF records can be linked directly to emigrant households. Earlier research on prepaid passage relied solely on aggregate administrative records or qualitative case studies. Through the course of my research I have identified a handful of other sources for prepaid passage that are potentially promising, including a prepaid passage program administered by the Hebrew Immigrant Aid Society in the early twentieth century. Research on the PEF can serve as a baseline to which future work on prepaid passage can be compared.

Two important conclusions of my research are that the likelihood and amount of PEF funding tended to increase with tenure in the Church and with the total amount available to be loaned (annual fund size). The first implication for kinship-based lending is that prepaid passage was rationed according to the chronological order of who expressed a desire to emigrate. The desire to emigrate would have been observable by close friends and relatives, though it was not recorded in any sort of general registry. It is not at all unlikely that potential lenders could have made use of such information. The second implication for kinship-based lending is that the budget constraint of the lending families would have affected the quantity of aid provided. A family with more wealth in America would have been better able to provide assistance, all else held equal. Unfortunately, neither of these hypotheses are likely to be directly testable at the household level due to the dearth of available records.

Other interesting conclusions of my research are that lending tended to increase with family size or with the number of male workers in the emigrating household, but the occupation of the potential borrower had no measurable effect. This may imply that the financial need of the borrower was more important than potential gains to the lender from strategically choosing borrowers with specific skills. Alternatively, the result could be specific to the Utah destination. Old World skills may have been less important to the Utah lender than sheer quantity of workers because of the high labor demands of clearing and farming the land. The same patterns could have existed for other kinship-loans offered by families engaged in farming. The quantity-over-quality decision may have been reversed, however, for lenders who were not farmers.

7.3 The Effect of Occupation on Emigration

Despite being unimportant for the provision of PEF passage loans, occupation played an important role in the timing of emigration for the household. This research adds breadth to the discussion of occupation and emigration. Existing research focusses on whether occupation or skill level affected the likelihood of an individual to emigrate. In general, nineteenth century emigration was dominated by individuals who were unskilled. My research explores the relationship between skill level and emigration among the population of individuals who want to emigrate. This adds a level of depth to our understanding.

Skill level of the household head affected the timing of emigration at qualitatively and statistically significant levels. Household heads with unskilled occupations experienced substantially longer delays between baptism and emigration than their better-skilled counterparts, on average. However, the relationship between delay and skill level was not linear. Highly skilled household heads, such as those with professional occupations, emigrated more quickly than unskilled emigrants but not as quickly as emigrants skilled in a manual trade, such as carpenters or blacksmiths. The nonlinear relationship is likely the result of differences in the transferability of skills to the Utah frontier.

Future research could benefit from two lines of inquiry in particular. First, the coding for occupation skill level could be subdivided more finely. Currently, one in four observations in my sample is coded as having a skilled occupation. The second largest category has about a third as many observations. This leaves room to further finesse the skilled occupation category. For instance, the category could be subdivided by industry. Increasing the number of skill level categories may provide additional insight into the relationship between timing of emigration,

prepaid passage, and occupation. A second extension to this research is to examine intergenerational occupational mobility. I plan to pursue this line of inquiry by linking the emigrant household head sample to the 1880 US Census.

7.4 The Role of Gender and the Family

One of the most interesting questions to surface in this research is related to the large number of emigrant households headed by women. The linked emigrant household sample I created includes 771 female-headed households. The MII contains an additional 1,600 female-headed households and a total of 4,300 women who traveled alone. The presence of so many women raises interesting questions about who they were and why they were traveling as household heads. I have found that many of the women listed their marital status as married or widowed, though marital status is missing for most. Among married women, the questions become more intriguing. Why did these women travel separately from their husbands? If their husbands also emigrated, did the women follow or precede the men?

A plausible story is that some men emigrated in advance of their families in order to prepare a new home in Utah. This is particularly compelling because of the work required to set up a new farm on the frontier. In addition to avoiding some of the risk associated with the first harvest, sending a husband ahead may have allowed the family to claim property sooner than if they waited for the entire family to emigrate together. To the extent that not all farmland was equally productive, sending a husband ahead may have provided an advantage in being able to claim superior land.

Alternatively, the women may have preceded their husbands. The years with the largest proportion of emigrant households headed by women corresponded with the US Civil War. Arrington (1958) found evidence that Mormon emigrants preferred a more northerly route to Utah via Canada in order to avoid perils associated with the Civil War. If a family feared the men could be conscripted into the fighting, then it may have been rational to delay emigration of the husband and adult sons until after the end of the Civil War.

Finally, I cannot overlook the possibility that some married women had no intention of reuniting with their husbands at any future point in time. For them, emigration to Utah may have been a de facto divorce. Independent emigration may have been more common among families where the wife was baptized but the husband never converted, and therefore had no desire to emigrate to Utah.

In the existing literature, female emigration and intra-family timing of emigration have received relatively little attention. The large number of women identified in the Mormon emigrant records makes this data source prime for further research. I have received a modest grant to further investigate a sampling of the female-headed households. Genealogical records will be used to identify whether the women were married prior to emigration. If so, I will locate their husbands and determine when, if ever, the husbands emigrated. With the records, I plan to look for systematic differences between households that traveled in stages and households that emigrated intact. I will also look for differences between women who preceded rather than followed their husbands.

APPENDIX A

COMPLETENESS OF THE MGT TRANSCRIPTION

A.1 Introduction

Prior to this dissertation, little was known about how many British baptismal records have survived from the nineteenth century. Even less was known about the completeness of the MGT, as an index to these early records. The following discussion represents a first attempt to quantify the record survival rate, in terms of the quantity of unique baptismal records included in the MGT, by year. Analysis is built in part upon research by Cynthia Doxey (2003) in which she compares 1851 census returns to modern FHL holdings. The proportion of total missing baptismal records is estimated using a capture-recapture approach, and a preliminary effort is made to suggest how many missing baptismal records can be attributed to loss of entire volumes of branch record books.

A.2 Completeness of the FHL Collection for Branch Records in 1851

Maintenance of Church membership records, including baptisms, in nineteenth century Britain was the sole responsibility of the individual congregations, called branches. Branches were grouped into conferences, based on geographical location. The number of branches and conferences in existence varied across time in response to fluctuations in Church membership. For some branches, the dates of formation are clearly documented, but for others, the dates are harder to find. Changes in

the geographical reach of each particular branch are also poorly documented. In fact, there is no known comprehensive list of nineteenth century British branches currently in existence.

Without a dependable census of branches, it is generally impossible to identify which branch record-books are missing from the FHL holdings. However, a quantitative comparison can be made for 1851, the year of the religious census in Great Britain. The 1851 religious census attempted to identify all congregational meeting places of all denominations in Great Britain. Doxey (2003) manually reviewed the branch record-book holdings of the FHL and identified which volumes included records for 1851. She then compared the FHL holdings to the Mormon congregations listed in the 1851 religious census.

Doxey located surviving records for 386 branches in the FHL collection. Of those, 134 were also included in the 1851 religious census. Doxey verified the existence of an additional 76 Mormon congregations enumerated in the 1851 religious census that were not present in the FHL collection, as summarized in table A.1. For the same year, Doxey found administrative reports published by the church indicating the presence of 642 active branches, but the reports did not include the names or locations of the branches. Doxey hypothesized that some branches were probably missed from the religious census because the congregations were either small or new, and the census enumerators simply were not aware of them. Branches mentioned in the religious census but not in the FHL collection imply that their associated records have been lost.

Because the FHL holdings and the religious census returns were generated independently, "capture-recapture" estimation can be used to infer the total number of branches originally in existence and the number of record books missing from

Table A.1: Number of Branch Records Found by Doxey for 1851.

		1851 Religious Census	
		Present	Absent
FHL Holdings	Present	134	252
	Absent	76	unknown

Table A.2: Capture-Recapture Estimation.

		Sample 1	
		Present	Absent
Sample 2	Present	a	b
	Absent	c	unknown

the FHL. The capture-recapture approach can be used to estimate the total size of a population where complete enumeration is not feasible. A researcher draws multiple, independent samples from a given population. In each sample, the observed individuals are "tagged" or otherwise identified. Overlap–or recapture of the same individuals in later samples–is used to infer the size of the entire population. Intuitively speaking, the greater the observed overlap, the less likely it was that many individuals escaped enumeration. In this case, the "individuals" being sampled were branch congregations.

Following the notation established in table A.2, the estimate of population size, $\hat{N}$, and its variance are functions of the total number of individuals observed in each sample and the extent of overlap.

$$\hat{N} = a^{-1}(a+b)(a+c) \tag{A.1}$$

$$\mathrm{Var}(\hat{N}) = a^{-3}bc(a+b)(a+c) \tag{A.2}$$

Capture-recapture estimation can be extended to include three or more samples, and to relax the assumption of sample independence. For more discuss, the interested reader is referred to Yvonne M. M. Bishop (1975).

Using the cell counts reported by Doxey, the capture-recapture estimate for total branches in the British Isles in 1851 is 604.9, with standard error of 25.401. Based on the point-estimate for the population size and its variance, there is a ninety-five percent probability that the true number of LDS branches in 1851 was between 554 and 656 branches. It is noteworthy that the interval estimate contains 642, the total number of branches published in the administrative reports for the year.

Based on the application of capture-recapture estimation to research by Doxey, it appears that the FHL collection includes record books for approximately 60% of the branches in existence in 1851. However, this is not to say that the collection includes written records for 60% of all baptisms performed in 1851. Branch records were maintained by volunteers who likely varied in their record-keeping diligence. Also, Doxey did not distinguish between whether a volume in the FHL collection was complete or partial. Her goal was to identify the particular branches in existence in 1851. Further analysis is required to determine how many unique baptismal records have survived to the present.

A.3 Inclusion Rate for the Transcribed MGT

Because of the way British membership records were kept in the 1800s, the only way to find an individual baptismal record is to search manually through volumes of branch record-books. The original MGT was created as an index to aid researchers in their search. No alternate sources exist at the individual level, other than the occasional autobiography or individual correspondence. So, capture-recapture estimation cannot be utilized at the level of the individual baptismal

record. Instead, the number of baptismal records can be compared to the number of reported baptisms for corresponding years.

Annual administrative reports of the British Mission include tallies of convert baptisms, by geographical conference. The reports were generated in the 1800s, so the totals can be considered to be independent of surviving branch record books. Evans (1984) compiled the tallies for convert baptisms for the years 1837 to 1936, and his compilation coincides with reported totals found in manuscript Mission reports and published reports in the Millennial Star. Following Evans' compilation, 107,078 individuals were baptized in the British Isles between 1837 and 1890, inclusive. The number of unique entries in the MGT transcription created for this dissertation can be compared to the totals taken from these administrative sources.

Overall, the MGT transcription contained a number of baptismal records that was roughly seventy-five percent lower than the British Mission tallies. The rate of inclusion varied year to year, with no apparent trends. For about two-thirds of the time period, the MGT transcription has an inclusion rate of about a tenth to a quarter of the administrative totals. For the remaining years, the proportion is higher. Two years standout as having particularly high inclusion rates. In 1857 and 1890, the inclusion rate was 60% and 46% respectively.

More than one possible explanation exits for the higher inclusion rate for 1857. Eighteen fifty-seven was the year of "reformation" for the British Mission. Church president, Brigham Young, called for a renewal of faith among church members. Some members renewed their commitment to the faith by being baptized a second time. It is unclear whether the Mission reported only original convert baptisms or included renewal baptisms in the annual total. While making the MGT transcription for this project, care was taken to distinguish renewal baptisms from

convert baptisms when they were noted (listed as "rebaptism"). However, some branch clerks may not have distinguished a "rebaptism" from a baptism in the record books. If renewal baptisms were not included in the Mission reports but were undistinguished by some branch clerks, then the record survival rate would tend to be inflated. On the other hand, if the renewal baptisms were included in the Mission report but not in the branch records, then the inclusion rate would be deflated.

An obvious cause of the higher inclusion rate in 1890 has not been identified. At the time, emigration was tapering off and added emphasis was being placed on building up permanent congregations the British Isles. Perhaps the emphasis on long-term organization provided a more persuasive motivation for clerks to maintain accurate record-books.

A.4 Possible Sources of Lost Baptismal Records

Several factors contributed to the survival of baptismal records to the present and to their inclusion in the MGT transcription created for this project. First, the modern FHL collection is incomplete, and missing record books could account for half of the missing records. In 1851, entire volumes were missing for 40% of the branches, and a total of 75.4% individual baptismal records are missing from all causes combined. If the baptismal records were distributed uniformly among all original branch books, then the proportion of individual baptismal records lost due to the incomplete holdings of the FHL was also equal to 40%. That leaves an additional 35% of records that were missing for other reasons.

Second, the original MGT may not include all entries in the existing FHL collection. No known documentation exists for which FHL volumes Margetts began or finished. Jaussi and Chaston (1982) compiled a list of branches believed to have records found in the MGT. This list is a helpful starting point, but it lacks important details about whether the indexing was partial or complete for any particular FHL volume.

Third, not only have some record-books been lost, but also the surviving record-books may not have been complete at the time they were originally created. The rate at which baptisms were recorded in the 1800s waxed and waned with the variable diligence of volunteer branch clerks. It bears noting that the original MGT has a higher rate of inclusion than the MGT transcription created for this project. Some baptismal records in the original MGT were omitted from the current transcription due to lack of information about the birth year.

A.5 Conclusion

This analysis combines existing research, administrative records, and an original manual transcription of the MGT to estimate the proportion of baptismal records which have survived to the present. While it is impossible to definitively identify all of the branches and individuals for whom baptismal records are missing, this analysis suggests that complete records can be found for approximately 25% of nineteenth century converts in the British Isles. Additional incomplete baptismal records are available, though they are missing the birth date of the convert. It seems likely that at least half of the missing records can be attributed to lost or damaged record books and may be recoverable as additional branch record books

surface in archives or personal collections. The remainder of missing baptismal records are likely attributed to omission by the original branch clerks.

Given the multiple mechanisms through which baptismal records could have been lost or omitted, it is surprising that so many of the records have survived. Future analysis of baptismal records would benefit from direct evaluation of the branch record books. In particular, research could focus on determining which volumes in the FHL collection were omitted from the MGT. As omitted branch volumes are identified, the overall estimate of surviving baptismal records will increase. Further research could also focus on identifying the record survival rate for each individual conference. Conference-specific research could illuminate whether geographical bias exists in which baptismal records have survived. There is not particular evidence to suggest personal prejudice would cause geographical bias, but an understanding of the survival rate by region would facilitate more accurate research.

APPENDIX B

REGIONAL CLASSIFICATIONS

London and Home Counties: Essex, Kent, Middlesex, Surrey.

South and East: Bedfordshire, Berkshire, Buckinghamshire, Cambridgeshire, Hampshire, Hertfordshire, Huntingdonshire, Norfolk, Northamptonshire, Oxfordshire, Suffolk, Sussex.

Southwest: Cornwall, Devon, Dorset, Gloucestershire, Somerset, Wiltshire

Midlands: Cheshire, Derbyshire, Herefordshire, Leicestershire, Lincolnshire, Nottinghamshire, Rutland, Shropshire, Staffordshire, Warwickshire, Worcestershire.

Wales: Anglesey, Brecknockshire, Caernarfonshire, Cardiganshire, Carmarthenshire, Ceredigion, Denbighshire, Flintshire, Glamorgan, Meirionnydd, Merioneth, Monmouthshire, Montgomeryshire, Morgannwg, Pembrokeshire, Radnorshire.

Northwest: Lancashire, Yorkshire West Riding.

Northeast: Cumberland, Durham, Yorkshire East Riding, Yorkshire North Riding, Northumberland, Westmorland.

Scotland.

Ireland.

Isle of Mann.

APPENDIX C

ACCURACY AND COMPLETENESS OF THE PEF INDEX

C.1 Introduction

A small but growing literature examines the impact of the PEF in nineteenth century immigration using quantitative analysis. The research relies heavily on an index to the PEF ledger created in 1992 by Ronald Watt in the Church History Department. However, prior to this project little was known about the completeness and accuracy of the loan entries from which the ledger was drawn. In this appendix I address several criticisms to using the PEF records for empirical research. I group the criticisms into those relating to the accounting system used to track loans and those relating to the legal proceedings following the Edmunds-Tucker Act. I conclude that the criticisms are not as weighty as previously believed.

C.2 The PEF Accounting System

The principle sources of administrative information about PEF borrowers are a four-volume ledger, a collection of surviving promissory notes, and a list of debtors to the PEF published in 1877. Additional accounting records include receipt books, blotters, and journals, but information from these sources would have been transferred to the ledger, at least in summary. Other primary sources include narrative passages in personal histories, journals, and letters.

One criticism of the surviving records is that the ledger and the collection of promissory notes were two separate accounting systems, and promissory notes were

returned to the borrowers upon complete repayment. If true, then research relying solely on the ledger index may be ignoring an important segment of borrowers. Furthermore, the surviving promissory notes would exclusively represent loans in default, and repaid loans recorded under that system would be completely lost. That implies research utilizing both the ledger index and the promissory notes would still be subject to substantial selection bias due to the underreporting of loans repaid in full.

C.2.1 Description of the Promissory Notes

Images of the surviving promissory notes fill a dozen reels of microfilm. The layout of the notes varied throughout the life of the fund, but the text remained generally unchanged, "One day after date [we] promise to pay to the President of the Perpetual Emigrating Fund Company, or Bearer, the sum of [blank] Dollars, lawful money of the United States, without defalcation or discount, and with Interest from date at the rate of Ten per cent. per annum, for Value Received." Most notes were preprinted, though some handwritten notes also appear. The names of the borrowers, their signatures (or mark), and the date the loan was signed were also recorded.

When a loan was intended to help a family emigrate, the note might list only the family head, the head and a few other adults or older teens, or all members of the family. Generally, only the household head and at most one or two other family members actually signed the note, but I found a number of examples where every member of the family signed the note, including children under the age of ten. The notes sometimes recorded the ages of family members with the names, but that was not generally true.

Accounting information was recorded by hand on the reverse side of the promissory notes. The top line inscribed an identification number for the note. The next line repeated the surname or full name of the household head. The third line repeated the loan amount and registered the volume and folio where the loan was entered into the ledger.[1] In some cases, an additional loan incurred en route was logged, along with an explanation such as, "To Transportation." The accounting information included all remittances, with the date and a general method of payment. Interest charges were added sporadically, sometimes years after the first date on the note. In cases where the loans were forgiven, the balance was listed as paid from the "Jubilee" account.

Additional information was added to both sides of the notes in pencil, presumably to aid in debt collection. The memos commonly included the occupation of the borrower and his or her city of residence. Information was also recorded for additional family members or close associates-especially the husbands of female borrowers. Some notes referred to the borrowers' ability or willingness to repay the loans. For instance, the clerk added a line to indicate the borrower had died, returned to his or her country of origin, or no longer wished to associate with the Church, each of which implied that the balance would not be collected. The memos entered in pencil are consistent with directions published as part of the massive collection effort in 1877.[2]

[1] I found one systematic discrepancy in the records. Many promissory notes referenced as volume "B" were actually recorded in volume "C" of the ledger. Examination of the volume "C" title page explains the incongruity. Originally titled "Vol. B" in pen, I found a correction was made in pencil. The "B" was crossed off and "C" written to the side.

[2] Mormon immigrants were organized into "companies" for the overland trek to Salt Lake. The instructions to the Indebtedness List requested that the company leader, called the captain, be named for each debtor. I rarely found the company captain listed on the promissory notes. This suggests the notes may have originally been organized by company, and the captains' names may have only been used to identify the correct note.

A notable limitation to research on the promissory notes is the selection bias evident in the surviving collection. According to the 1877 list, notes were removed from the collection as they were repaid (Indebtedness List, Letter of Instruction). In earlier research, Watt found a note that was paid in full. He observed a handwritten message on the note saying it should be returned to the borrower (Watt, *personal interview*). Of the notes from 1861 that I reviewed, most were in default. The remaining debts had been officially forgiven in part or in full, as indicated by a final payment from the "Jubilee" account.

C.2.2 Description of the General Ledger

Nearly all of the information recorded on the promissory notes was also recorded in the ledger, suggesting the two sources were part of one, integrated system. The ledger also includes balance sheets for various accounts within the PEF, including expense accounts, donations, and individual loans. This suggests the ledger was considered the summary source for information on all PEF accounts.

The PEF ledger comprises four volumes. Each volume measures about eleven inches by seventeen inches by two inches, bound on the long side. The pages are light blue with preprinted horizontal writing lines. Volumes were labeled "A" through "D" with handwritten titles on the first page of each book. Each page was numbered in the upper outside corner. Entries were made in pencil or pen, and the pencil entries in particular are occasionally difficult to read. Each loan entry in the ledger recorded the identification number for a corresponding promissory note. This facilitated cross-referencing between the two types of documents. The information in the ledger entry essentially copied all the accounting entries from

the promissory note, including the penciled notes to aid in debt collection. I found three material exceptions to the otherwise matching entries.

First, the names of borrowers included in the ledger were not necessarily identical to those on the promissory note. In many cases, the ledger recorded fewer individuals than were listed on the note. Another discrepancy was in the spelling of names. Not only were nicknames, initials, and abbreviations sometimes used, but even the surname spelling may have varied between the sources. Nonstandard spelling was typical for the era, and it must be taken into account (Atack 1992).

Second, the date on the ledger entry was later than the date on the promissory note. Entries in the ledger tended to cluster around one or two dates each year, indicating they were recorded in batches. The dates were commonly in the last three months of the year, after the end of the overland immigration season. Fortunately, entry into the ledger was not delayed excessively.

Third, the accounting notes in the ledger began from the date of entry into the ledger, not the date the note was signed. Remittances and additional loans acquired before arrival in Salt Lake were only recorded on the reverse side of the promissory note. If transactions occurred en route, the adjusted outstanding balance was recorded in the ledger rather than the amount of the original loan. For research on financing immigration, all loans should be combined for analysis, so the ledger total would be appropriate. Early repayment of loans could introduce bias, however potential bias would probably not be meaningful, since early repayment was rarely recorded.

C.2.3 Description of the Ledger Index

In 1992, the Church History department created an alphabetical index to the loan entries in the ledger. The index lists each borrower, the amount borrowed, the volume and page of the entry, and the date the loan was entered into the ledger. The index also includes additional information in a "Comments" section. The comments in the index are not the same as the pencil-written notes to help with debt collection. "Others listed" indicates that more than one borrower was listed for the same loan. A loan with three borrowers would be listed three times in the index, once for each borrower, and each entry would be identical except for the name. Where the ledger named a third-party guarantor for a loan, that guarantor is listed in the comments as "Surety." Another comment that regularly appears in the index indicates that the borrowers were "Sent for" by someone already in the Valley.[3]

C.2.4 Estimating the Total Number of PEF Borrowers

I began my comparison of the ledger index and the promissory notes under the assumption that the two were independent methods of tracking loans, hopefully with some degree of overlap. I had no a priori beliefs about which loans were recorded in either system; however, I suspected that the only promissory notes still in the collection were for loans in default. Manual examination of the promissory notes was focused on those dated 1861. By that time, the accounting system would have been well-established. Also, immigration flows were relatively high that year. I hoped that any systematic patterns in the loan records would be easier to spot

[3]Initial review of the ledger and index suggested that "Surety" and "Sent for" were recorded sporadically in the index, so the designations were not included in the analysis.

Table C.1: Comparing Original Promissory Notes to the Ledger Index for 1861.

		Collection of Promissory Notes	
		Present	Absent
Index to the Ledger	Present	385	684
	Absent	14	unknown

in 1861 than in earlier or lower-volume years. In the process of reviewing the notes, significant overlap with the ledger index became apparent. Ledger entries occasionally had minor discrepancies in the listed names and loan amounts, but often the two records were identical.

The number of loans missing from the ledger index is estimated using a "capture-recapture" framework.[4] The PEF data lend themselves well to capture-recapture estimation, because the two accounting systems are like separate samples from the population of PEF borrowers. Names listed on the promissory notes were compared, one-by-one, with the names recorded in the ledger index. The outcome of this comparison is shown in table C.1. The nearly 400 individuals listed on 1861 notes represent about a third of the ledger index entries for the year. Surprisingly, all but fourteen of the borrowers listed on the notes were also in the index.[5]

The capture-recapture estimation suggests that 96.3% of all PEF loans were recorded in the index to the ledger.[6] The mere handful of loans missing from the ledger index does not support the claim that the notes and the ledger were two separate accounting systems. The occasion omissions are better understood as a

[4]See appendix A for an introduction to capture-recapture estimation.

[5]I found twelve notes dated 1861 in the collection of notes for 1862. All twelve were recorded in the index.

[6]Estimated population size is 1,096, with standard deviation of 8.569.

reasonable margin of error for a manual accounting system maintained without the benefit of computerized cross-checks.

Loan amounts in the two sources were compared as an evaluation of whether clerical errors often crept into the ledger index. Ninety-two percent of the ledger entries listed exactly the same loan amount as the promissory notes. Seven percent of the loan amounts were higher in the ledger, and one percent were lower.[7] These differences were not generally clerical errors. To the contrary, most were explained by the acquisition of additional loans en route to Salt Lake, as registered on the reverse of the promissory notes. The correspondence in loan amounts lends further support for the use of the ledger index in academic research.

C.3 The Escheat of PEF Records in 1887

In an effort to stunt the growing power of the Church in Utah, an unusual law was passed by the US Senate and House in 1887. This law, known as the Edmunds-Tucker Act, dissolved both the PEF and the sponsoring Church as legal entities and authorized government confiscation of all associated record books and most property (Whitney). Church officials challenged the act by filing a series of lawsuits against the escheat of the property and records. The issue was caught up in litigation until 1893, when a joint resolution of Congress reversed the Edmunds-Tucker Act. All property and records were returned to the church in 1896. Despite the reversal, the PEF never resumed activity. Not only had Church leaders found

[7] I compared recorded loan amounts for 837 loans issued in the 1860s. The loan amounts recorded on the notes and in the ledger were identical for 768 loans. The ledger was higher for 58 loans. The ledger was lower for 11 loans.

different ways of helping new immigrants, but annual immigration to Utah had also slowed considerably (Arrington 1958).

One criticism of the surviving PEF records stems from the nine-year period when the legal status of the PEF was in dispute. During the legal battles, a court-appointed "receiver" had charge over the disputed property and records. Some suspect the receiver moved the records, and some documents may have been lost in the process (Watt, *personal interview*). The Deseret Evening News reported that the first receiver, Frank. H. Dyer, took possession of the PEF property on 18 Nov 1887. The property consisted of a safe, a desk, $2.25 in defaced silver coin, records, account books, promissory notes, and papers of various kinds. The newspaper reported that Dyer would remove the property to his office or "another private place" at some point in the near future, but a follow up article to that effect was not found (Journal History, 18 Nov 1887, page 3). Wilford Woodruff, a prominent church official, recorded in his journal, 23 November 1887, "Marshal Dyer took posession of our Office to day. Locked up all the Desks & took the Keys [sic]." Woodruff made no mention of documents being removed to another location.

The only other available information comes from Woodruff's journal entry detailing the return of confiscated property, 9 January 1894,

> To day the supreme Court here ordered the Receiver to turn over the Money to the Presidency of the Church amounting to ($438,174.39) which will help us to partly to Pay our debts. Also the shares 4,742 of the Telegraph Line And office furniture in the hands of James Jack in Church office, in Presidents office office furniture and Books in Historians office and office furniture turned over By late Receiver Dyer to

> Present Receiver Lawrence. Now this order to turn over this money will assist us to pay a Part of the Debts [sic].

This journal entry suggests the office furniture may have been shuffled between locations; however, the "Books" were listed as being all in one place.

Another concern is that Dyer or Lawrence may have attempted to collect on outstanding debts and may not have returned all the confiscated records (Watt, *personal interview*). The Deseret Evening News reported that the PEF had more than $400,000 in net assets when Dyer took possession of the records (Journal History, 18 Nov 1887, p. 3). The Comprehensive History of the Church, volume six, records that Dyer resigned in 1890, under allegations of mismanagement. The next receiver, Henry W. Lawrence, seems to have been more closely monitored. Because the PEF accounts are relatively quiet after 1887, the allegations of mismanagement probably centered around the property and accounts of the church rather than the PEF. Furthermore, I found no mention of collection efforts by the receiver in the historical documents.

Thorough inspection of the ledger and promissory notes could produce more definitive answers to these questions. Review of individual remittances could clarify whether any payments were collected during the tenure of the receiver, because the dates were recorded along side the amounts. The detail in the ledger may also explain whether or not the surviving promissory notes represent all the loans in default. The note collection seems to be unusually small, compared to the one-third loan default rate reported by Arrington. Direct observation of repayment in the ledger would not only lead to more accurate calculation of the repayment rate but also indicate whether a note has survived for each loan in default.

C.4 Conclusion

My analysis of the PEF records indicates that they are more complete and thorough than previously believed. The ledger and the promissory notes were not separate accounting systems. To the contrary, they were two parts of a methodical system used to carefully track PEF loans. First, every family or individual borrowing from the PEF had to personally sign a note promising to repay the loan. As the borrowers arrived in Salt Lake, the notes were numbered and recorded into the general ledger. The amount and date of each remittance was documented on the promissory note and in the ledger. As balances were repaid, the promissory notes were removed from the PEF files.

PEF clerks were able to cross-reference the notes and the ledger entries, because they recorded identifying information on each source. The folio and volume for each ledger entry was recorded on the corresponding note, and the promissory note number was recorded along with the other loan information in the ledger. Collection efforts benefited from this careful accounting. In 1877, a list of debtors was published and widely distributed. Detailed information was gathered on each borrower. This information was recorded both on the promissory notes and in the ledger.

I base these conclusions on both textual and empirical analysis. While the capture-recapture analysis was limited to records from 1861, notes and ledger entries throughout the life of the PEF were also examined. The habits of the clerks in 1861 do not appear to be an anomaly. The accounting style seemed to remain consistent through all the years, including the use of identification codes to cross-references between document types.

I found no evidence to corroborate claims that the receivers lost, destroyed, or otherwise refused to return any of the confiscated records, and I did not confirm claims that the court-appointed receivers attempted to collect on loans. While the absence of evidence does not definitively negate the claims, the lack of published complaints suggests they may not have been perceived as problems at the time. I want to emphasize that the loan records in the ledger appear to be complete. Any damage to the ledgers, such as missing pages or volumes, would be obvious since the volumes and folios were dated and numbered sequentially. Despite allegations of mismanagement and other uncertainty, the general ledger appears to have escaped damage and loss. Furthermore, I outlined an empirical approach that could be used to specifically address questions about the promissory notes.

This research breaks new ground. Currently, the surviving promissory note collection is grouped haphazardly by year of issue. If the archivists who cataloged and microfilmed the notes had known about the numbering system used by the PEF clerks, then the notes would have been filmed in order. Instead, the notes were grouped randomly within each year. Researchers must skim through hundreds of notes to find a particular record. The creation of the ledger index would also have benefited from these findings. If the promissory note identification numbers had been included in the index, then the index could have been as helpful in locating the promissory notes as it already is in finding the original ledger entries.

These findings should inspire greater confidence in the use of the PEF records for quantitative research. Researchers can be confident the ledger index accurately identifies which immigrants received loans and how much they borrowed before arriving in Salt Lake. Not only are they interesting for research on the PEF itself, but the records can also be linked to other nineteenth century data sources.

Borrowers can then be compared to other borrowers or to self-funded immigrants, depending on the other data used. This rich data source allows research on the differential affect of loan receipt on any number of outcomes, limited only by the availability of contemporary records and the creativity of the researcher.

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